

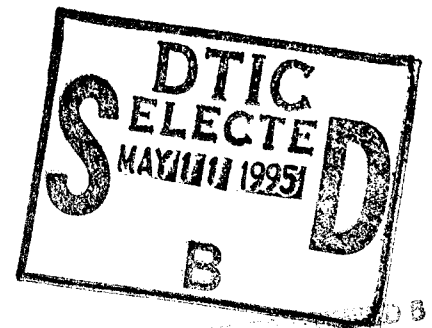
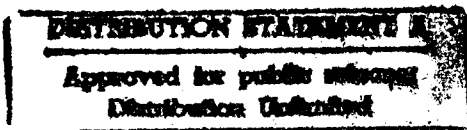


*Office of the Secretary of Defense  
Deputy Director  
Defense Research & Engineering  
Office of Technology Transition*

**FEDERAL DEFENSE LABORATORY  
DIVERSIFICATION (FDLD)  
TECHNOLOGY TRANSFER PROGRAM  
FISCAL YEAR 1995**

**PROGRAM INFORMATION PACKAGE**

**March 17, 1995**



**19950505 201**

## ***PROGRAM INFORMATION PACKAGE***

### ***FEDERAL DEFENSE LABORATORY DIVERSIFICATION TECHNOLOGY TRANSFER PROGRAM FISCAL YEAR 1995***

#### **INTRODUCTION**

Title 10, United States Code, section 2514, requires the Secretary of Defense to establish a Federal Defense Laboratory Diversification (FDLD) Program to encourage greater cooperation in research and production activities carried out by defense laboratories and industry. The Deputy Director, Defense Research & Engineering, Office of Technology Transition, (DDDR&E/OTT) was established as the department's focal point for this program, as well as for all dual use technology transfer programs within the department. Title 10 U.S.C., sections 2501 and 2511, and Public Law 103-337, section 1113(a), establish the statutory requirements for this program. Public Law 103-337 authorized the funds and Public Law 103-335 appropriated the FY 1995 funds for the program. The statutes provided in Title 10 and Public Law, and the applicable guidance provided in Congressional Committee Reports, are summarized for reference in Appendix C.

A DoD-wide Broad Area Announcement was issued by DDDR&E/OTT to announce the program and to invite potential participants to request this Program Information Package (PIP). The purpose of this PIP is to provide information useful for formulating and structuring lab/private sector proposal partnership teams, developing ideas and concepts, selecting activities, determining matching funds required, and conforming with statutory requirements. Included within this PIP are: general proposal guidance; planned program execution information; the dual use technology transfer topics of interest to specific laboratories; and the operations other than war/law enforcement topics and their specific laboratories.

#### **PURPOSE OF THE FDLD PROGRAM**

The principal purpose of this program is to pursue the DoD Dual Use Strategy to invest in R&D on technologies important to both defense and commercial applications, to integrate the defense and commercial industrial bases and to access commercial capabilities for military systems. This will be accomplished by catalyzing the transfer of technology from the defense laboratories to private sector partners for commercialization "spin-off" and/or by adapting commercial technology for defense "spin on" to reduce acquisition costs. The dual-use concept involves technologies applicable to both commercial and military needs and supports a strong economy. A strong contribution by the FDLs is necessary to increase the rate at which technology is "spun off" to commercial systems or "spun on" to defense systems. By providing a portion of partnership funding to the defense laboratory, this program will allow defense laboratory technologists to play an active role in the technology conversion process.

## EXECUTION

The Federal Defense Laboratory Diversification Program will be executed through the defense laboratories. For purposes of this program, FFRDCs are not included in the definition of defense laboratories. The DoD laboratory research and development organizations will select industry partners, provide in-house technical expertise and manage the selected projects. Contract selections and awards will be made by the specific DoD laboratory identified in the topics contained in Appendices A and B. In accordance with Title 10, competitive procedures will be used to select all industry partnerships. About 10 to 15 teams will be funded at approximately \$1 million for year one, with 1 to 2 one year options. Projects will be planned with approximately 20% DoD funding at the defense laboratory and 80% DoD funding contracted out to industry. The industry portion of the project must be 50% cost shared.

In accordance with Title 10 U.S.C., industry partnerships should be comprised of at least two non-affiliated industrial organizations. The industry partnership should submit one integrated proposal to the defense laboratory for consideration. For-profit industrial organizations will be lead contractors for the FDL Program, since a purpose of the program is to facilitate development of or access to dual-use technology. These industrial firms may be non-defense entities or defense contractors and they may be teamed and/or augmented by federal laboratories, institutions of higher education, state agencies, government-owned/contractor-operated industrial facilities, Federally Funded Research and Development Centers (FFRDCs) which have been designated as research laboratories, non-profit research corporations and others that support the firms. The defense laboratory identified in the specific topic will review proposals according to the criteria in the following sections, and select a single partnership proposal, which shall include at least 2 industrial organizations.

The FDL will develop the second part of the project proposal which outlines the integration of in-house activities with those of the industrial partnership. The FDLs and their industrial partners will form an Integrated Technology Development Team, to include company manufacturing and marketing personnel, as well as technologists, for spin-off projects, and a Systems Program Officer/Program Executive Officer representative for spin-on projects. One combined (two-part) proposal for the FDL/industry team will result for each topic. It is intended to maximize the probability that the technology will be successfully commercialized by considering downstream production or systems integration issues, as the case may be, at the outset of the project. A successful output of a FDL project will be a brass board/prototype which will bring a technology to the threshold of commercialization or system integration.

## ELIGIBLE PARTNERSHIP PARTICIPANTS

Title 10 U.S. Code, provides detailed guidance on the formation of partnerships. Chapter 148, provides the following definitions:

Non-Department of Defense Participants (Section 2511). In each partnership, entities of the partnership shall include two or more eligible firms or a nonprofit research corporation established by two or more eligible firms and may also include, as determined appropriate by

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SecDef, a Federal Laboratory or laboratories, government-owned and operated industrial facilities, institutes of higher education, and agencies of state governments.

Eligible Firms (Section 2491). A company or other business entity that (a) conducts a significant level of its research, development, engineering, and manufacturing activities in the United States; and (b) is a company or other business entity the majority ownership or control of which is by United States citizens or is a company or other business of a parent company that is incorporated in a country the government of which--

(i) encourages the participation of firms so owned or controlled in research and development consortia to which the government of that country provides funding directly or provides funding indirectly through international organizations or agreements; and

(ii) affords adequate and effective protection for the intellectual property rights of companies incorporated in the U.S. Such term includes a consortium of such companies or other business entities, as determined by the Secretary of Commerce.

**FINANCIAL COMMITMENT AND COST SHARING REQUIREMENTS**

Title 10 also defines the required financial commitment of non-federal government participants in Section 2511(c): To the maximum extent practicable, funds provided by the government under a partnership will not exceed the amount provided by non-Federal government participants. The statutory requirements for cost sharing is derived from this section and from Fiscal Year 1995 Public Law 103-337, and require non-government participants in all projects to provide at least 50 percent of project costs. Cost sharing demonstrates the offeror's financial commitment to the project and the partnership, making the successful completion of the project in the offeror's best interest. Each proposal may be submitted to only one topic and the proposer is responsible for ensuring that their proposed cost share meets all statutory requirements as synopsized herein.

The general test for constructing a cost share contribution should consider the following:

(1) Is the resource under the control of or used by the proposer (not by an individual member of a consortium)? If so, does it actually contribute to the successful completion of the project's statement of work?

(2) What is the fair market value of that resource, and is the calculation of its value described in the proposal?

(3) Contributions **not allowed as part of cost share** include foregone fees and profits on the proposed project; costs previously incurred (except, in some cases, intellectual property; see below); and cost of work done on past or concurrent government contracts.

Classification as either cash or in-kind contribution:

Cash contributions are outlays of funds to support the total project through acquiring material, buying equipment, paying labor, (including benefits and direct overhead associated with that labor), and other cash outlays required to perform the statement of work. Government IR&D (FAR 31-205-18(E)) funds are considered to be the proposers own funds and may be used as a source of cash, even though they are reimbursed by the government. However, IR&D must be clearly identified and described as such. (IR&D from past contracts, however, is not

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considered eligible as cost share.) Cash can be derived from any source of funds within the proposer's accounting systems, or derived from outside sources, such as donations from state or local government, or funds from venture capitalists.

In-Kind contributions are the reasonable value of equipment, materials or other property used in the performance of the statement of work. Generally, in-kind contributions are difficult to value (e.g. space, use of existing equipment, intellectual property). When proposing intellectual property for in-kind cost share, the offeror should consider the following: Is its use central to the project; is it a real or incidental resource; what is the fair market value of the intellectual property as it is actually used on the project? The in-kind value of equipment (including software) and space (including land or buildings) shall not exceed its fair market value pro-rated according to the share of its total use dedicated to the project statement of work.

The competitive selection of a partnership and project includes the quality of cost share as part of its evaluation of a proposer's commitment to productize and commercialize the results of the partnership's efforts. Therefore, the specifics of the cost share proposed should be described in sufficient detail to allow this determination.

#### **GENERAL PROPOSAL GUIDANCE AND PROJECT SELECTION**

As discussed above, it is expected that about 10 to 15 teams (combined FDL/industry partnerships) will be funded at approximately \$1 million in DoD funds for year one, with 1 to 2 one year options. Projects will be planned with approximately 20% DoD funding at the defense laboratory and 80% DoD funding contracted out to industry. The industry portion of the project will be 50% cost shared. In a typical project, approximately \$200,000 will fund the defense laboratory technology transfer and approximately \$800,000, matched by \$800,000 in cost share, will fund the industry participation. The program will be structured with two parts: part A for the contractor and part B for the in-house defense laboratory. The proposal guidance and project selection criteria provided herein are intended to apply to part A, industry participation.

Defense Laboratory participation. The 20% funding to the defense laboratory is intended to support active technology development/validation at the lab. The lab activities supported should be on the critical path to project success. Accordingly, the labs should forward proposal part B related to technologies for which they have strong resident capabilities. In contrast, proposed lab activities which are parallel to or incidental to the work of the industrial partner, would not be acceptable.

Selection Process. All proposals will be submitted through the FDL Point of Contact designated in the topics (Appendices A & B). Projects will be funded by year, beginning with the first year funded with FY 1995 funds. It should be recognized that the funding available will not support projects in all topics nor all technologies. There will be a limited number of highly promising projects funded, which address the topics in Appendices A & B.

Eligible firms should submit proposals which demonstrate commercialization potential and include preliminary business plans to access the commercial (spin off) or defense (spin on) market,

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as the case may be. Proposals must also include financial plans which delineate funds and spend rates for program management, support, technical, overhead, etc., and should explain the 50% cost sharing agreements proposed by the industrial partners. Proposals must clearly delineate cost share contributions (e.g. cash, technology, facilities, overhead cost or other).

**Proposal Evaluation Selection Criteria.** In accordance with Title 10, competitive procedures will be used to establish all partnerships. Proposal evaluation will require cost sharing, as described in the above section. Criteria for selection of proposals, in order of priority, will include: (1) Extent partnership advances national security objectives; (2) Technical excellence; (3) Qualifications of personnel proposed; (4) Timely private sector investment to achieve goals and objectives of the partnership, other than through the partnership; (5) Potential effectiveness of partnership in further development and application of technology developed by the partnership, for the national technology and industrial base; (6) Financial commitment of eligible firms to partnership; (7) Does not unnecessarily duplicate other projects; (8) Other criteria the Secretary prescribes: these shall include probability of commercialization and/or probability of military system integration; adequacy of technical resources; and financial feasibility.

The proposal will be considered to demonstrate technical excellence if the proposed effort advances the technology or process beyond current fielded state of the art, and the proposed effort is clearly superior, innovative or unique. The technical approach must include a clear delineation of objectives consistent with definitive milestones and a definitive successful end point. There must be a coherent approach to mitigating technical risk. The proposal must demonstrate technical feasibility consistent with the emerging state of the art and proposed cost.

The FDLs will determine the most effective/appropriate vehicle for industry participation (e.g. contract, cooperative agreement, grant, CRADA, other transactions). Each lab will evaluate proposals for their topic of interest within the guidance provided herein, and will tentatively select one private sector partnership (made up of 2 or more eligible firms) and integrate necessary partnership agreements between industry and the defense lab. Upon selection of prospective private sector partners, the FDL/Private Sector teams will elaborate the program plan into a multiphase implementation plan, which will be called the Project Plan, to include both the prospective private sector plan as well as technical and program management sections addressing the federal defense laboratory participation.

One Project Plan per topic will be reviewed by a Joint Service Review Board, chaired by the DDDR&E, Office of Technology Transition, with members representing all of the Services and Defense Agencies. An independent assessment of commercial potential will be conducted. The assessment will principally evaluate the Commercialization Business Plan (section 4). Independent business based/business experienced technical support will be used to determine commercialization potential as: "green" (acceptable), "yellow" (unacceptable as presented, but potentially acceptable with reforms), or "red" (unacceptable). The independent technical support personnel will be selected by a third party organization, will all execute non-disclosure and conflict of interest statements, and each member will make a separate determination on each project. With input from independent business analyses, the Joint Service Review Board will

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recommend projects to the Director, Defense Research & Engineering (DDR&E), within the funding available. The DDR&E will approve the final program.

## **PLANNING FOR SUBMISSION OF PROPOSALS**

### **Submission of Proposals**

All industry proposals must be submitted to the defense laboratory address provided on the individual topic of interest. Any proposals mailed to an address other than that specified on the specific topic, will not be evaluated. The handling procedures below only apply to proposals submitted to the mailing address specified in Appendices A & B of this document. Electronic transmittals cannot be accepted.

### **General Proposal Handling Procedures**

Government employees will evaluate and select proposals. All government employees are bound by 18 U.S.C., subsection 1905 not to disclose proprietary information. An indication that data is proprietary should be included where appropriate in top and bottom margins. The government will not execute individual non-disclosure statements with proposers. Non-government commercialization experts will be used in evaluation of the commercial potential and the commercial business plan. Non-government employees having access to proprietary data will also be required to execute a non-disclosure certificate. Any offeror unwilling to allow non-government employees access to one or more volumes of its proposal will stipulate **GOVERNMENT ONLY ACCESS** on the outside of the envelop and again on each applicable volume and section of the proposal when it is delivered so that the proposal may be handled properly.

### **Volume I: Planned Technical Proposal Format**

Technical proposals will be a maximum of thirty five pages long. Section 1 of the technical proposal will be a maximum of five pages and it is left to the proposer to determine how best to use the remaining thirty pages. The following four sections are planned:

**Section 1 - Executive Summary:** The first five pages of the planned technical proposal format will be an executive summary of the entire proposal. The executive summary will be evaluated on its merit before the remainder of the technical proposal and will be extremely influential in the early identification of high interest offerings.

**Section 2 - Body of the Proposal:** This section will give a detailed explanation of the technical approach, merit and benefits derived from the proposed activities, and the management plan.

**Section 3 - Statement of Work:** A Statement of Work will be supplied which gives a detailed discussion of the specific tasks to be carried out, identifying the specific team

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member planning to execute each task, a schedule of significant events and measurable milestones (at least two per year).

**Section 4 - Commercialization Business Plan:** A detailed description of the business planning accomplished to date for the follow on to this proposal (e.g. plans to raise capital, follow on production and distribution plans, etc. ) The level of detail should be sufficient to demonstrate commercial potential.

**Volume II: Planned Cost/Funding Proposal Format**

Cost/funding proposals will have no page length limit or page layout requirements and will address funding over a 12 to 36 month period of performance; structured as a 12 month base period of performance and one or two 12 month options as necessary. Work breakdown schedules will not be required. Cost/funding proposals will be organized to include the following three sections, in order:

**Section 1 - Total Proposed Cost:** An executive summary of the cost to the government (section 2) and the cost share (section 3).

**Section 2 - Cost to the Government:** Adequate Contract Pricing Proposals must be submitted in accordance with guidance on the following pages, and must include Standard Form SF1411.

**Section 3 - Cost Sharing:** Detailed description of the financial commitment to productize and commercialize the results of the project; cost share classification; description of Cash contributions; description of In-Kind contributions; assumption of risk by team member, including, but not limited to, availability and quality of proposed cost share and future financial commitments. Definitions of each category of cost sharing are provided in the previous section of this document titled Cost Sharing Requirements. In accordance with Title 10, all industry proposals must contain 50% cost sharing.



**March 17, 1995**

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## **GUIDANCE FOR ADEQUATE CONTRACT PRICING PROPOSALS**

### **1.0 GENERAL:**

- 1.1 An SF1411 with all applicable blocks properly completed.
- 1.2 An index, appropriately referenced to specific page numbers, identifying all the cost or pricing data and information accompanying or identified in the proposal.
- 1.3 Cost or pricing data which is identified but not included in the proposal must be readily available. The proposal must specify the location and point of contact where the data may be obtained.
- 1.4 A summary of total costs by cost element for each accounting period and a breakdown of this data by contract line item. In the event of options, a summary inclusive of all years of total costs shall be prepared along with a summary of costs by year.
- 1.5 Identification, description and submittal of all Forward Pricing Rate Agreements (FPRA) utilized.
- 1.6 Identification and submittal of cost or pricing data which are based on verifiable factual information. In addition, an explanation of the estimating process including:
  - 1.6.1 The judgmental factors applied and the mathematical or other methods used in the estimate, including those used in projecting from known data.
  - 1.6.2 The nature and amount of any contingencies included in the proposed price.
- 1.7 Disclosure of any other prior, current or potential activity of which the Offeror is aware that could materially impact the incurrence of costs for work proposed (existing excess material, company reorganizations, new technology acquisitions, labor union discussions, etc.)

### **2.0 MATERIALS:**

- 2.1 A narrative explanation of the basis for the kinds, quantity and cost of all material elements proposed.
- 2.2 Unless an alternate method of estimating material costs has been accepted by the Contracting Officer, provide a priced bill of material for each proposed line item and a consolidated priced bill of material for the entire proposal (preferably in descending extended value order) showing part number/description, unit cost, quantity required, any nonrecurring costs, extended cost, basis for the proposed price (quotation, prior buy, similar item, etc.) and the rationale for the reasonableness of the proposed price (competition, catalog, price analysis, etc.).
- 2.3 A summary by class of material (subcontracts, purchase parts, etc.) showing base material costs and any factors applied (escalation, attrition, usage variance, etc.) and the basis for the development and application of these factors.
- 2.4 Specific subcontract effort to be performed and identification of each subcontractor. For each subcontract over \$100,000, and consistent with the instructions on the SF1411, provide a listing by source, item, quantity, price, type of subcontract, degree of competition, and basis for establishing source and reasonableness of price, as well as the results of review and evaluation of subcontract proposals when required by FAR 15.806. Where the required data or review have not been made available, provide the reason for the omission and provide dates when the data/reviews will be available.
- 2.5 Identification of any standard commercial items. Provide either a cost breakdown or an exemption justification in accordance with FAR 15.804-3(e).
- 2.6 Identification of any interorganizational transfers. Provide complete supporting data and basis for determining reasonableness.

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**3.0 DIRECT LABOR:**

**3.1 Identification of labor hours by:**

3.1.1 Task by labor category/skill mix by line item with supporting rationale (historical experience, engineering estimates, learning curves, etc.).

3.1.2 Labor category (by month, quarter or year as applicable).

**3.2 Identification of labor rates by labor category (by month, quarter or year as applicable).**

3.2.1 Where FPRA proposals have been submitted but not agreed to, identify proposal by date and to whom submitted.

3.2.2 In the absence of an FPRA or labor rate proposal submission, provide the base period and rates used. Identify any adjustment factors to these rates (including the effect of union agreements, turnover, escalation, midpoint of performance, etc.).

3.3 Summation of direct labor costs by category for each overhead pool and year.

**4.0 INDIRECT COSTS:**

4.1 Where FPRA proposals have been submitted but not agreed to, identify proposal by date and to whom submitted.

4.2 In the absence of an FPRA or direct rate proposal submission, provide the cost breakdowns, trends, budgetary data and rationale to support the expense pool elements and base cost for each indirect cost rate.

4.3 Summation of indirect costs by year using the proposed rates applied to the respective bases.

**5.0 OTHER COSTS:**

5.1 List all other costs by category (travel, computer, overtime premium, graphics, royalties, etc.) and provide supporting schedules and rationale for the amount proposed for each category.

**6.0 FACILITIES CAPITAL COST OF MONEY (FCCM):**

6.1 In the absence of any FPRA or identification of a Cost of Money Factor (CMF) proposal submission, provide a completed CASB-CMF Form. Provide supporting calculations for the proposed FCCM amounts.

**7.0 PROFIT:**

7.1 Offerors are encouraged to provide the rationale for proposed profit (DD Form 1547, Record of Weighted Guidelines Application, with rationale, may be used).

**8.0 CRITERIA FOR ADEQUATE TRAVEL COSTS:**

8.1 Proposed travel costs shall include the following: City and state of origin; city and state of destination; cost of transportation; per diem per day; car rental per day; miscellaneous (i.e. airport parking); number of days; number of trips; number of persons per trip; local mileage; total travel costs. In accordance with Joint Travel Regulations, local travel is \$0.25 per mile, airfare and car rental shall be economy class.

CONTRACT PRICING PROPOSAL COVER SHEET		1. SOLICITATION/CONTRACT/MODIFICATION NO.	FORM APPROVED OMB NO. 9000-0013				
<small>Public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (VRS), Office of Federal Acquisition Policy, GSA, Washington, D.C. 20405; and to the Office of Management and Budget, Paperwork Reduction Project (9000-0013), Washington, D.C. 20503.</small>							
NOTE: This form is used in contract actions if submission of cost or pricing data is required. (See FAR 15.804-6(b))							
2. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)		3A. NAME AND TITLE OF OFFEROR'S POINT OF CONTACT		3B. TELEPHONE NO.			
		4. TYPE OF CONTRACT ACTION (Check)					
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">A. NEW CONTRACT</td> <td style="width: 50%;">D. LETTER CONTRACT</td> </tr> <tr> <td>B. CHANGE ORDER</td> <td>E. UNPRICED ORDER</td> </tr> <tr> <td>C. PRICE REVISION/REDETERMINATION</td> <td>F. OTHER (Specify)</td> </tr> </table>		A. NEW CONTRACT	D. LETTER CONTRACT	B. CHANGE ORDER	E. UNPRICED ORDER
A. NEW CONTRACT	D. LETTER CONTRACT						
B. CHANGE ORDER	E. UNPRICED ORDER						
C. PRICE REVISION/REDETERMINATION	F. OTHER (Specify)						
5. TYPE OF CONTRACT (Check) <input type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (Specify)		6. PROPOSED COST (A + B = C) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">A. COST</td> <td style="width: 33%;">B. PROFIT/FEE</td> <td style="width: 33%;">C. TOTAL</td> </tr> </table>			A. COST	B. PROFIT/FEE	C. TOTAL
A. COST	B. PROFIT/FEE	C. TOTAL					
7. PLACE(S) AND PERIOD(S) OF PERFORMANCE							
8. List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer. (Continue on reverse, and then on plain paper, if necessary, use same headings.)							
A. LINE ITEM NO.	B. IDENTIFICATION	C. QUANTITY	D. TOTAL PRICE	E. REF.			
9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING (If available)							
A. CONTRACT ADMINISTRATION OFFICE		B. AUDIT OFFICE					
10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? (If "yes," identify)  <input type="checkbox"/> YES <input type="checkbox"/> NO		11A. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? (If "Yes," complete Item 11B)  <input type="checkbox"/> YES <input type="checkbox"/> NO		11B. TYPE OF FINANCING ( / one) <input type="checkbox"/> ADVANCE PAYMENTS <input type="checkbox"/> PROGRESS PAYMENTS <input type="checkbox"/> GUARANTEED LOANS			
		12. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS? (If "Yes," identify item(s), customer(s) and contract number(s))  <input type="checkbox"/> YES <input type="checkbox"/> NO					
13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES AND FAR PART 31, COST PRINCIPLES? (If "No," explain)  <input type="checkbox"/> YES <input type="checkbox"/> NO							
14. COST ACCOUNTING STANDARDS BOARD (CASB) DATA (Public Law 91-379 as amended and FAR PART 30)							
A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? (If "No," explain in proposal)  <input type="checkbox"/> YES <input type="checkbox"/> NO		B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS-1 or 2)? (If "Yes," specify in proposal the office to which submitted and if determined to be adequate)  <input type="checkbox"/> YES <input type="checkbox"/> NO					
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NON-COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)  <input type="checkbox"/> YES <input type="checkbox"/> NO		D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)  <input type="checkbox"/> YES <input type="checkbox"/> NO					
<small>This proposal is submitted in response to the RFP, contract, modification, etc. in Item 1 and reflects our best estimates and/or actual costs as of this date and conforms with the instructions in FAR 15.804-6(b) (2), Table 15-2. By submitting this proposal, the offeror, if selected for negotiation, grants the contracting officer or an authorized representative the right to examine, at any time before award, those books, records, documents and other types of factual information, regardless of form or whether such supporting information is specifically referenced or included in the proposal as the basis for pricing, that will permit an adequate evaluation of the proposed price.</small>							
15. NAME AND TITLE (Type)		16. NAME OF FIRM					
17. SIGNATURE			18. DATE OF SUBMISSION				

March 17, 1995

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## APPENDIX A

### PAGE INDEX

#### FEDERAL DEFENSE LABORATORY DIVERSIFICATION PROGRAM

#### DUAL - USE TECHNOLOGY TRANSFER TOPICS

<i>Topic Title</i>	<i>Page Number</i>
Heterojunction Bipolar Transistor Fabrication Program	15
Wavelength Division Multiplexing for Advanced Fiber Optics Systems	15
Digital Cable Test System	18
Micromirror Arrays for Aberration Correction in Optical Devices	19
Infrared Camera Technology for Thermal Diagnostics	19
Integrated Helicopter Design Tools	20
Collision Avoidance Countermeasures for Highway Vehicles	22
New Approaches to Food Packaging, Preservation and Preparation.	23
DNA Immunization	24
Advanced Testing and Evaluation of the Mutant E. Coli Enterotoxin LT <sub>R192G</sub> Adjuvant	25

March 17, 1995

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**FEDERAL DEFENSE LABORATORY DIVERSIFICATION PROGRAM  
DUAL - USE TECHNOLOGY TOPICS**

Number: **FDLDP-001**

**1. AGENCY:** USAF Wright Laboratory

**TITLE:** Heterojunction Bipolar Transistor Fabrication Program

**2. LABORATORY AND TECHNOLOGY.** Wright Laboratory has invented and developed an innovative heterojunction bipolar transistor (HBT) which has state-of-the-art microwave power and low noise performance. This effort was completed entirely with an in-house Air Force R&D research team at Wright Laboratory. The potential dual-use applications include cellular phone systems, intelligent vehicle highway systems (IVHS), other wireless communications systems, and phase array radar. This invention is an enabling technology that can be far-reaching for all applications that require very high solid state-power with high efficiencies and linearity. The technology has been demonstrated and it is ready to be transitioned to industry.

**3. OBJECTIVE:** The project objective is to develop enhanced performance, reliable, low cost GaAs-based HBT devices and circuits based on the thermally-shunted HBT invented by Wright Laboratory. The technology has demonstrated high power, high efficiency, high frequency, high voltage and low noise performance. These performance increases will greatly enable all applications requiring solid state power. Technology development will focus on a thermally-shunted HBT which is robust, reproducible, uniform, reliable, high yield and high performance. Thermal stability, electrical characteristics and reliability related to these HBTs will be studied. These studies should establish design rules and fabrication processes for devices and circuits suitable for commercial and military applications at microwave frequencies. The schedule and development are:

Year 1 - Reproduce critical aspects of Wright Laboratory's thermally-shunted HBT fabrication process at the participant's facility and start reliability tests.

Year 2 - Develop commercial circuits and continue reliability studies.

Year 3 - Finish reliability tests and refine circuits

**4. TECHNOLOGY TRANSFER POTENTIAL:** This technology has potential commercial and military applications in cellular phone systems, intelligent vehicle highway systems, other wireless communications systems, and phase array radar. Benefits expected are that the private sector will be able to manufacture low cost commercial products and military components from this technology, create jobs for both commercial and defense markets and improve United States competitiveness.

**5. PRINCIPAL LABORATORY AND POINT OF CONTACT:** USAF/Wright Laboratory

Mailing Address: Wright Laboratory/AAKR  
2530 C Street, Building 7  
WPAFB OH 45433-7323

Contact Specialist: Tessie Smith (513) 255-5311  
DSN 785-6871

Technical Personnel: Gary McCoy (513) 255-6871  
DSN 785-6871

Number: **FDLDP-002**

**(1) AGENCY:** Naval Command, Control and Ocean Surveillance Center

**TITLE:** Wavelength Division Multiplexing for Advanced Fiber Optics Systems

**(2) LABORATORY AND TECHNOLOGY:** Naval Command, Control and Ocean Surveillance Center Research, Development, Test and Evaluation Division (NCCOSC RDTE DIV), with ONR 6.1 and 6.2 funding, has developed a unique fiber optic device -- the Polarization Independent Narrow Channel (PINC) Wavelength Division Multiplexing (WDM) fiber-optic coupler.

The PINC WDM is made by fusing together two sections of optical fiber into one fiber to transfer energy to the second fiber. This optical coupling is a function of the physical characteristics of the fused fibers, and most



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importantly, the wavelength of the input optical signal. By properly designing and fabricating the fused fiber coupler, it can be made to efficiently combine two different wavelength signals onto a single fiber, or separate two signals which have propagated on a single fiber. An obvious use and benefit of this fiber-optic coupler is to increase the information capacity of a fiber link by allowing more than one transmitter signal to propagate and to be received. A second benefit is that optical multiplexers allow for increased flexibility in fiber system distribution and routing architectures. By using wavelength selective devices, such as PINC WDM fiber-optic coupler, separate nodes on a link can address specific nodes, with the sending and receiving nodes identified by a wavelength "address".

Successful demonstration of the PINC WDM fiber-optic coupler has generated considerable interest in DoD and industry. Initial applications of this coupler were considered for fiber optic hydrophone-based acoustic arrays for ocean surveillance and seismic exploration; long distance remote surveillance data telemetry; and long-haul fiber optics telecommunications which are applicable for both commercial and military systems. All of these applications involved relatively simple system designs based on two-channel PINC WDM designs.

While the two channel PINC WDM enables the realization of systems which to date have not been technologically achievable, it has limited application for routing and distribution based on wavelength selection. These functions are required for advanced fiber telecommunications, surveillance, computer network, and cable television systems. Other wavelength division multiplexers with a higher channel number, and operating in the optimum 1550nm region, have been demonstrated using integrated optics circuit technology. However, these devices suffer from relatively high loss, poor channel isolation, input polarization sensitivity, and environmental sensitivity. They are also in an early stage of basic research development, and are expensive to produce. Therefore, the development of a high channel number PINC WDM fiber coupler would be a significant contribution to the technology base, because it would allow the design and development of more complex fiber architectures for future military and commercial applications.

**(3) OBJECTIVE:** The objective of the PINC WDM fiber-optic coupler is to:

- (a) Extend the design and fabrication methods of the basic two wave-length channel PINC WDM fiber-optic coupler to multiple channels (up to 16 channels) while maintaining the optical performance characteristics, such as low loss, high-channel isolation, and environmental insensitivity of the two-channel device.
- (b) Develop the complementary fiber optic system components, e.g. stabilized single wavelength laser transmitters.
- (c) Design and demonstrate advanced architecture fiber-optics based systems using the PINC WDM technology.

**(4) TECHNICAL DESCRIPTION:** Current fiber-optic coupler multiplexers that are commercially available operate using two-channel wavelengths at 1300 and 1550 nanometers (nm). These wavelengths are chosen because: (a) they match the wavelengths where the local minima of the fiber attenuation occur; (b) laser transmitters can be made at these wavelengths; (c) the WDM fiber-optic couplers are easily made because of this large wavelength channel separation. These current fiber-optic coupler multiplexers have limited applications for two reasons: (1) the fiber signal attenuation at 1300 nm is significantly greater than that at 1550 nm, and (2) a practical optical amplifier does not exist for 1300 nm. Therefore, for a long distance and/or multipoint fiber distribution system, wavelength multiplexing with one channel at 1300 nm would require numerous opto-electronic repeaters (which convert the signal from optical to electrical, amplify the electrical signal, and then convert it back to an optical signal). These repeaters degrade overall system performance and add to system acquisition and maintenance costs. On the other hand, the signal at 1550 nm matches the absolute fiber attenuation minimum and, most importantly, Erbium Doped Fiber Amplifiers (EDFAs), which comprise all optical amplifiers that perform signal amplification without conversion of the optical signal to an electrical signal, operate in the 1550 nm region with an extended bandwidth of approximately 60 nm.

NCCOSC developed PINC WDM fiber-optic coupler solves the problems and limitations associated with commercial 1300/1550 WDMs by operating with a narrow channel separation (on the order of 20-30 nanometers) in the 1550 region. To accomplish this, many physical and engineering problems had to be overcome, including the sensitivity of the coupling to input light polarization, the maintenance of low loss, and minimization of environmental sensitivity. The two channel PINC WDM fiber-optic coupler operating with EDFAs in the 1550 nm region was successfully demonstrated in a brassboard bidirectional 210 km fiber telemetry for long-distance remotely-located acoustic surveillance arrays.

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The following format outlines the development, design and fabrication of the PINC WDM fiber-optic coupler in year-by-year increments and specifies the tasks to be undertaken by NCCOSC and those to be performed by an industrial organization.

**YEAR 1:** NCCOSC will be responsible for the development of the high-channel number PINC WDM fiber-optic coupler. The primary task will reduce the separation between channel wavelengths from the current value of approximately 25 nm to approximately 4 nm. This will require that higher-order polarization compensation techniques be used without suffering increased coupler optical signal loss. In the first year, NCCOSC will develop the coupler design parameters and fabrication methods to achieve this, and will demonstrate a low-loss, extremely narrow-channel PINC WDM fiber-optic coupler. Two tasks will be undertaken by industry in the first year. The first will be to develop extremely stable, single-wavelength laser transmitters in the 1550 nm region. Transmitters with preselected emission wavelengths, separated by the PINC WDM fiber-optic coupler channel spacing, will be designed, and the fabrication methods to produce the devices will be investigated and developed. The second task will be to design one or more advanced fiber optic systems, using the high-channel number PINC WDM technology and the matching laser transmitters to demonstrate the utility of the higher order wavelength multiplexing. This system could apply to telecommunications, surveillance, computer networks or cable television.

**YEAR 2:** In the second year, NCCOSC will continue to develop the higher channel PINC WDM, with the emphasis on device packaging to optimize device performance, that is, to minimize sensitivities to environmental disturbances which might be encountered in practical applications, such as temperature, pressure, and humidity variations. Testing will be performed in-house to determine the limits of performance of the device with respect to these factors. Prototype high-channel number PINC WDM fiber-optic couplers will be fabricated, tested, and delivered to industry for testing. In year 2, industry will fabricate and test the matching laser transmitters, and deliver devices for system demonstrations. A prototype (brassboard) system to implement and demonstrate the high channel number WDM components will be assembled, tested and characterized.

**YEAR 3:** NCCOSC will develop and incorporate design and fabrication improvements for the PINC WDMs. If possible, improved performance devices will be fabricated and delivered for demonstration. Industry will build and demonstrate a field deployable system using the PINC WDM components and stabilized laser transmitters developed in this program.

**(5) TECHNOLOGY TRANSFER POTENTIAL:** The technology transfer potential of the PINC WDM fiber-optic coupler is very high. Teaming with industry NCCOSC will develop the necessary components to design and build high channel number WDM fiber optic systems for higher information capacity and greater signal distribution and routing flexibility. Those organizations in industry currently developing fiber optic based surveillance, telecommunications, computer networks, or cable television systems could use the new component technology to design and develop new fiber optic systems for these applications. Benefits will be realized in improved performance over current systems, resulting in reduced system acquisition and maintenance costs. In addition, new system configurations, not possible with today's technology will become feasible, opening new markets.

**(6) PRINCIPAL LABORATORY AND POINTS OF CONTACT (POC):**

Mail Address: Naval Command Control and Ocean Surveillance Center  
RDT&E Division  
53570 Silvergate Avenue  
San Diego, CA 92152-5047

Principal POC: Dr. Brenda Lee Karasik, Code 0143, (619) 553-2101  
Dr. M. N. McLandrich, Code 555, (619)553-1066  
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**Number: FDLDP-003**

**(1) AGENCY:** Naval Undersea Warfare Center (NUWC) Division Keyport

**TITLE:** Digital Cable Test System

**(2) DEFENSE LABORATORY AND TECHNOLOGY DESCRIPTION:** Complex, multi-conductor cable and connector continuity and crosstalk are tested with a digitally encoded test signal to detect the slightest intermittent faults while the cable is physically subjected to environmental stress screening including low level random vibration. A 1992 Naval Post Graduate School study showed that cable and connector defects are a major cause of weapon system failure. Existing testing techniques do not reveal intermittent problems of new or in-service cables and connectors. This cable testing concept is applicable to virtually all military systems. NUWC Division Keyport performs acquisition testing and depot level test and repair. Over a thousand cable tests based on this concept has demonstrated a factor of ten in cable test time reduction over standard methods and an intermittent defect detection repeatability level of 99.9 percent. This technology has been developed and is being patented by members of the Environmental Test Sciences Department, Code 53 at NUWC Division Keyport, who routinely develop test procedures and fixtures to perform environmental stress screening of electronic and mechanical equipment.

**(3) OBJECTIVE:** The objective is to improve the reliability of US made products by proliferating this technology through profit motivated joint military-commercial ventures. Cable and cable test set manufacturers as well as cable users have shown strong interest in producing and/or using a cable tester based on this technology. The concept is applicable to complex cable and connector systems and electronic assemblies which include fiber optic and radio frequency signal paths. To meet cable testing demands, commercial products are needed ranging from suitcase sized portables, to large systems capable of testing over three thousand conductors at a time, and built-in testability of military combatants and high-value commercial systems, such as commercial aircraft.

**(4) DETAILED DESCRIPTION:** NUWC Division Keyport will support the transition of military developed advanced cable testing technology to competitively selected for-profit companies to meet the objectives above.

Year 1: NUWC Division Keyport will develop a portable version capable of testing a 746 conductor electrical cable and will evaluate the merits of including other environmental stresses in the procedure. Commercial sector partners will be selected through the BAA process to perform marketing studies, to develop commercialization plans, and to design for first article production. CRADAs will be placed as appropriate.

Year 2: NUWC will develop a high capacity cable tester capable of testing over 3000 conductors simultaneously and demonstrate the capability for testing fiber optic cables. Commercial partners will establish production lines and begin marketing first articles.

Year 3: NUWC will develop and demonstrate both in-situ and long cable testing and fault isolation. This promises to alleviate system teardown and cable removal now necessary to perform cable tests, it enables future systems designs to include built-in testing, and it supports buried or embedded cable testing. Commercial partners will add new models to their lines capable of testing sophisticated cables with thousands of fiber-optic and/or electrical conductors. They will also expand their line to cover low-cost cable testing needs, such as personal computers and telecommunications, in order to spread this testing technology and enhance product reliability throughout the industrial base.

**(5) TECHNOLOGY TRANSFER POTENTIAL:** Conceived in 1988 as a means to detect intermittent Mark 48 Advanced Capability Torpedo cable problems, it is likely that this revolutionary technique will be integrated into all digital cable testers in the future. A built-in test capability to allow cable testing and fault isolation during full integrated system tests using this technology is feasible and should be developed as well. Using its full industrial production, test and evaluation capability, it is expected that NUWC Division Keyport will produce cable testing products for use in the federal sector based on product designs developed in conjunction with the commercial partners who will produce them for the private sector. The Patent Disclosure dated August 24, 1994 is titled the Digital Cable Test System (DCTS) and the NAVSEA 00L5 legal council is Ed Conners. The concept demonstration prototype has proven to be cost effective. Design improvements are expected to enhance wide-spread utility, simplicity of use and cost attractiveness.

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**(6) PRINCIPAL LABORATORY AND POINTS-OF-CONTACT:**

Naval Undersea Warfare Center Division Keyport  
610 Dowell Street  
Keyport, WA 98345-7610

Principal Point-of-contact: Tom Ott, Code EDX, (360) 396-2239  
Contract Specialist: Frances Cole, Code 022, (360) 396-2933  
Technical Personnel: Gary Combs, Code 531, (360) 396-1807.

**Number: FDLDP-004**

**1. Agency:** Wright Laboratory Avionics Directorate, WPAFB OH

**TITLE:** Micromirror Arrays for Aberration Correction in Optical Devices

**2. DEFENSE LABORATORY AND TECHNOLOGY.** Micromirror arrays consisting of thousands of individually controlled mirror elements, each a few hundredths of a millimeter in size, have been investigated for optical communications applications under a contract funded by WL/AAAI.

**3. OBJECTIVE.** The objective is to apply the micromirror array technology to achieve more effective and lower cost aberration correction in optical devices such as video zoom lenses, optical disk read-write heads and two dimensional bar code scanners.

**4. DESCRIPTION OF TOPIC.** In year one, micromirror arrays will be characterized experimentally and in computer simulation, particularly with regard to the required control algorithms (developed under contract to WL/AAAI). Candidate commercial applications will be identified, and prototype demonstration systems will be designed. In year 2, the most promising prototype system will be fabricated and tested.

**5. TECHNOLOGY TRANSFER POTENTIAL.** Micromirror arrays have exceptional potential for high payoff transition to commercial applications, particularly with regard to achieving more effective and lower cost aberration correction in numerous types of optical devices. Improved effectiveness results from a large number of degrees of freedom available from many micromirror elements, and lower cost resulting from micromirror arrays fabricated as inexpensive silicon integrated circuit chip. Advancing the technology in commercial markets will lead to reduced costs and competitively driven upgrades being available for the military applications.

**6. PRINCIPLE POINT OF CONTACT:**

Mail Proposals to: USAF Wright Laboratory/AAKR  
2530 C Street, Building 7  
WPAFB, OH 45433

Contact Specialist: Ms. Tessie Smith, (513) 255-5311; DSN 785-5311

Principal POC: Capt R. Shute, (513) 255-3455; DSN 785-3455

**Number: FDLDP-005**

**1. Agency:** U.S. Air Force Rome Laboratory

**TITLE:** Infrared Camera Technology for Thermal Diagnostics

**2. DEFENSE LABORATORY AND TECHNOLOGY.** Air Force/Rome Laboratory. A continuing R&D project in platinum silicide infrared (IR) technology at Rome Laboratory culminated in a state-of-the-art, patented IR camera. This is a silicon-based sensor technology which is, in effect, an infrared camcorder sensitive in the 3-5 micron rather than in the 0.4-0.7 visible region. The camera output is compatible with commercial TV, thus

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allowing for standard monitor display, tape recording and playback functions. Wide-dynamic range, 12-bit digital output is also available allowing for more sophisticated signal processing operations such as tracking.

A combination of in-house research and technology investments has led to extensive technology transfer to industry where cameras of up to 300,000 detectors are made. The project to retrofit the B-52 with PtSi cameras is shortly to begin the production phase. The camera addresses a wide variety of reconnaissance and surveillance applications as well as laser target designation, missile seeker and intelligence function applications. The group of experts involved in this R&D program are intact in Rome Laboratory's Electromagnetics and Reliability Directorate at Hanscom Air Force Base. Their expertise runs the gamut from detector device material science to camera design and characterization, and from algorithm development in image and signal processing to software testing and real-time circuit implementations.

**3. OBJECTIVE.** The objective is the commercial development of the PtSi camera technology for applications in medicine, process control, and/or perimeter and property surveillance control. Any silicon manufacturer who can make visible arrays can modify their facility to include the manufacture of infrared arrays. Infrared cameras can be built which are about the same size, and need the same battery power as a TV camcorder.

**4. DETAILED DESCRIPTION.** As a preface to the anticipated program flow, we note that potential commercial applications are very broad as detailed in Part 5 below. Hence, a critical decision must be made early in the program whether to develop a general purpose, generic application IR camera, or one geared toward a specific application niche such as medical. The adjuncts, i.e. bells and whistles, essential or desirable for the application can then be traded-off against cost. We envision a three year program phased as follows:

- a. A technological feasibility study and a market survey to decide on the specific application niche (6 months)
- b. Camera design while beginning manufacture of the critical component, the detector array chip (6 months).
- c. Build a first generation prototype of the camera. Characterize and test (12 months).
- d. Build a second generation prototype and repeat tests (6 months).
- e. Final tests in application environment including user personnel to set final design before manufacture (6 month)

**5. TECHNOLOGY TRANSFER POTENTIAL.** Potential civilian applications include: (1) Night time property surveillance without lighting, (2) Industrial production line monitoring, (3) Electronic circuit board testing and monitoring, (4) Navigational aid in poor weather for airplane, boats or automobiles, (5) Examination of fine art, (6) Non-invasive medical diagnostics, (7) Police surveillance, (8) Fire fighting. Anticipated feed-backs into Military infrared technology are improvements in cooling technology; size, power and weight decreases; and in new algorithms and real-time circuit implementations for special purpose adjuncts to the camera.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT.**

Send proposals to: Rome Laboratory/PKPF  
26 Electronic Parkway  
Griffiss AFB, NY 13441-4514

Contract Specialist: Ms. Carla Wallaesa, Tel: 315-330-7092

Technical Points of Contact at Rome Laboratory (Hanscom AFB MA):

Jerry Silverman, 617-377-3295; DSN 587-3295  
Paul Pellegrini, 617-377-3699; DSN 587-3699  
Freeman D. Shepherd, 617-377-3200; DSN 587-3200

**Number: FDLDP-006**

**1. AGENCY:** Army Aviation and Troop Command Research, Development and Engineering Center

**TITLE:** Integrated Helicopter Design Tools (IHDL)

**2. DEFENSE LABORATORY AND TECHNOLOGY:** Army Aviation and Troop Command Research, Development and Engineering Center (AVRDEC), Aviation Applied Technology Directorate (AATD), Fort Eustis, VA. Technologies proposed for Spin-on include such as ACSYNT (aircraft synthesis) for computer aided aircraft

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conceptual design fostered by NASA and ARPA and 3-D modeling such as pioneered by Boeing Airplane Company on their commercial 777 program. AATD resident experts will contribute to adaptation of these commercial technologies to develop tools for later support of Program Executive Officer - Aviation. Commercial technologies use will avoid cost and delay in design tool development.

**3. OBJECTIVE:** Develop integrated conceptual and engineering design tools for commercial, military and dual use helicopter design to provide trade-off and sensitivity analysis both early and throughout the development cycle. The tools should provide automated linkages between airframe and subsystem design and analysis disciplines including aeromechanics; structures; acoustic, radar and infrared signatures; sensors; manufacturing; maintenance; and cost analysis; based on consistent 3-D geometry. The effort will use existing methodologies and be focused an integration of these methodologies. The tools should provide operational capability as a conceptual design tool with simplified performance representations of disciplines and subsystems or alternatively, a selected subset of engineering level tools. Object oriented programming to support reusable code, parallel processing and distributed processing should be used. Provision for the capability of quantifying commercial and military effectiveness should be included. Tools will enable Integrated Product and Process Development (IPPD) management approach for commercial or military projects. The IHDT will use a building block approach consisting of blocks for tools associated with each of the members and disciplines. The blocks will link the tools in a simulation environment which supports operation in an integrated fashion.

**4. DESCRIPTION:**

Year 1: - Conduct overall system design, conduct design reviews, and demonstrate the top level conceptual design tools with linkages of a subset of engineering disciplines. The IHDT configuration at the end of year 1 is expected to consist of the following building blocks:

- An existing modeling and simulation environment, e.g. J-MASS or TACTICS.
- An existing conceptual design methodology, e.g. HELIPAC/HAVDEM.
- A subset of existing engineering design tools (aerodynamics; structures; acoustic, radar and infrared signatures; and sensors design tools).
- An existing 3-D geometry defined through previous computer aided design efforts.
- Linkages between the above blocks.

Year 2: - Incorporate existing methodologies for disciplines not included in Year 1 and demonstrate functionality with all linkages. Add the following building blocks during year 2:

- Manufacturing
- Maintenance
- Cost analysis
- Military & Commercial applications

Year 3: - Incorporate methodology building blocks not included in year 1 or 2. Demonstrate application of tools to selected commercial or military project (e.g. Comanche, Apache, or Bird Dog). Resultant IHDT will be resident at both the government and contractor facilities.

**5. TECHNOLOGY TRANSFER POTENTIAL:** The sharply declining military helicopter R&D and production is drastically reducing the foundation for commercial helicopter improvement and undermining our foreign and domestic competitiveness. Simultaneously the civil/military customer base is increasingly concerned with the cost of helicopter purchase and operation. The tools to be developed will reduce commercial and military development cost and cycle time and ownership costs and increase our industries competitiveness.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposals to: Director, U. S. Army Aviation Applied Technology Directorate

AMSAT-R-TC

Fort Eustis, VA 23604-5577

Contracting Officer: Ms. Lauren Sebring

(804) 878-4828

Technical Personnel: Jeff MacDonald

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**Number: FDLDP-007**

**1. AGENCY:** Army Tank-Automotive Research, Development and Engineering Center

**TITLE:** Collision Avoidance Countermeasures for Highway Vehicles

**2. DEFENSE LABORATORY AND TECHNOLOGY:** U.S. Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI. The Army has invested \$4M during FY92-FY94 for development of the TARDEC Visual Model (TVM) as a tool to aid ground vehicle signature countermeasure design and assessment. Within TARDEC, the Survivability Technology Center with support from the National Automotive Center (NAC), developed a Cooperative Research and Development Agreement (CRADA) with the General Motors Corporation to extend TVM for commercial driving applications as well. The project has begun by adapting the Army's knowledge of visual acquisition to the design of passenger vehicles with greater visibility - "camouflage in reverse." Preliminary results from this program point toward the first successful attempt to account for a 20% reduction in rear end collision in some areas of the country after incorporating the Center High Mounted Stop Light (CHMSL) or "third tail light" in 1985. The program address a potential multi-billion dollar cost savings to the American consumer by targeting an estimated 14% of vehicle crashes which occur simply because drivers didn't see the other vehicle. Improvements to the model developed during the proposed project will feedback to model improvements for military counter-measures design and assessment.

**3. OBJECTIVE:** Develop additional visual model improvements and perform subsequent calibration and validation of various "conspicuity" metrics within the TARDEC dual use human perception laboratory for both military and commercial highway applications

**4. DESCRIPTION:**

- Year 1: • Extend the human perception model to visual tasks associated with driving, e.g. velocity discrimination, distance estimation, radial and lateral acceleration.
  - Develop field-realistic perception test plans, procedures and laboratory simulation facilities.
  - Develop and configuration-manage application-specific software.
- Year 2: • Extend the visual modeling technology for driver's time-dependent visual adaptation.
  - Conduct direct- and indirect-view sensor performance evaluations for degraded visibility conditions.
  - Conduct perception testing and analysis for model calibration.
  - Model case study of elderly driver performance at high traffic intersection scenarios.
- Year 3: • Plan, execute, and analyze field validation tests.
  - Conduct vehicle collision system design & performance tradeoffs in TARDEC perception test facility
  - Tech transfer to American automotive community

**5. TECHNOLOGY TRANSFER POTENTIAL:** The TVM model which originally addressed low contrast military vehicle signatures has immediate application in the reverse direction. It can model and enhance the detectability (conspicuity) of automotive vehicles at high traffic intersections and other visually challenging scenarios by simulating the performance of simple active and passive visual countermeasures which increase overall car visibility on the nation's road system.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposals to: U. S. Army Tank-Automotive Research, Development and Engineering Center  
 AMSTA-AQ-WA  
 Warren, MI 48397-5000

Contracts POC: Scott Sinelli (810) 574-6368

Technical POCs: Dr. Grant Gerhart (810) 574-8634, gerhartg@tacom-emh165.army.mil  
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**Number: FDLDP-008**

**1. AGENCY:** Army Natick Research, Development & Engineering Center

**TITLE:** New Approaches to Food Packaging, Preservation and Preparation.

**2. DEFENSE LABORATORY AND TECHNOLOGY:** U. S. Army Natick Research, Development & Engineering Center, Natick, MA. DoD technologies for ration preservation in the areas of advanced thermal preservation methods, such as ohmic heating or microwave sterilization and new " Cold preservation " technologies, such as high pressure preservation and pulsed electric field treatment, have the potential to significantly enhance ration quality, acceptability and logistics. These technologies have two major advantages in both commercial and military uses: 1) Shelf-life may be extended both for traditional shelf stable foods and for new semi-perishable items and 2) New fresh-like items akin to home cooked meals may be provided where both refrigeration and preparation facilities may be minimal.

**3. OBJECTIVE:** The primary objective is that the military will have available from an insured dual-use production base the most acceptable and nutritious rations that can be used in any environment. Barriers that may hinder commercialization such as regulatory approval, product/process optimization and consumer acceptance will be identified then addressed through the engineering and operation of a pilot scale processing/packaging system to serve as a model Good Manufacturing Practice demonstration site.

**4. DESCRIPTION:**

Year 1 - A coordinated research program will be centered at one pilot plant site for each new technology to be selected for manufacturing demonstration. The uniformity and reliability of the treatment to control the microbial population will be established through improved microbiological validation studies, process modeling and the use of appropriate physical or chemical indicators, either intrinsic or extrinsic to the food as pioneered at the Natick RD&E Center Prototype products of different classes of foods will be produced to demonstrate the quality advantages and improved nutritional value in comparison with traditional thermally processed foods.

Year 2 - The pilot processing system will be interfaced with a packaging system capable of meeting the stringent military shelf-life requirements for combat rations. The prime contractor shall prepare Developmental Design Drawings and Associated Lists according to DI-DRPR-81002. Critical Control Points for the process will be identified and monitored for several different prototype foods using both in-process monitors and chemical, physical and microbial analytical techniques and appropriate methods of sensory analysis. A technology transfer plan will be developed that includes an economic analysis of a scale up of the prototype pilot plant processing/packaging system.

Year 3 - Final regulatory approval from the operating pilot plant system will be submitted. Shelf-life limits will be defined for demonstrator products by controlled temperature storage studies. An environmental assessment will compare the traditional commercial process to the new process. A marketing plan will be developed. Provide a final Producibility Program Plan according to DI-MISC-80006.

**5. TECHNOLOGY TRANSFER POTENTIAL:** Both military and civilian consumers are demanding high quality, but convenient foods demanding little preparation time. Increasing nutritional awareness is creating additional demand for minimally processed fresh-like food. The DoD future Family of Operations has planned for future insertions of technological advances to improve both the variety and quality of individual and group rations.

The desire to meet consumer demands through new technology is hampered by a low profit margin of in US food industry and high capital investment in existing thermal processing and freezing equipment. Without a focused R&D effort such as this, for processing by cold preservation, rapid thermal sterilization and improved packaging, US food producers will be unable to remain competitive. Additional incentive is a potential reduction in energy and water consumption when compared to century-old technology of retort processing or canning.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposals to: U. S. Army Natick Research, Development & Engineering Center

ATTN: SATNC-PB

Natick, MA 01760-5011

Contract Specialist - Arthur O'Dea (508) 651-4289

Technical POC - C.Patrick Dunne (508) -651-5514



**FOR INFORMATION AND PLANNING PURPOSES ONLY: NOT A SOLICITATION****Number: FDLDP-009****(1) AGENCY:** Naval Medical Research Institute**TITLE:** DNA Immunization.

**(2) DEFENSE LABORATORY AND TECHNOLOGY:** Naval Medical Research Institute (NMRI), Naval Medical Research and Development Command; DNA vaccination. NMRI has developed technology for DNA immunization against malaria, and has established the animal model systems and human challenge models to demonstrate conclusively the effectiveness of DNA immunization against malaria, and the capacity of DNA immunization to induce specific immune responses, especially cytotoxic T lymphocyte responses. Under the supervision of CAPT S. L. Hoffman, MC USNR proprietary commercial technology will be "spun on" to meet the NMRI Malaria Program's primary objective of developing vaccines to protect the operating forces against malaria.

**(3) OBJECTIVE:** Because of the enormous impact malaria has had and continues to have on readiness of the operating forces, malaria vaccine development is consistently ranked as the number one science and technology objective for DoD medical research and development. Progress toward development of modern vaccines against malaria and other threats to the readiness of DoD personnel has been seriously undermined by lack of a safe, inexpensive, highly effective vaccine delivery system. The recently discovered technique of DNA immunization has the potential to revolutionize development and fielding of all vaccines. NMRI and partners have recently reported the first successful use of DNA vaccines against a nonviral infection. They protected mice against a highly virulent malaria infection. Such a vaccine could have an enormous impact on malaria in military personnel, and has clear commercial potential for the 30 million U.S. and European community residents that visit malarious areas each year, and for the 1 billion people who live in malarious parts of the world. It is therefore the objective of this proposal to develop and commercialize malaria vaccines, and to bring DNA immunization technology to humans for development and commercialization of other DNA vaccines.

**(4) DETAILED DESCRIPTION:**

Year 1: The genes encoding 5 *Plasmodium falciparum* sporozoite and liver stage proteins, and 4-5 *P. falciparum* erythrocytic stage proteins will be cloned into plasmids developed for human use. The expression of the specific proteins in mammalian cells will be established, and the methodologies for prerequisite pre-clinical safety and immunogenicity studies will be established. Studies of immunogenicity and protective efficacy in *Aotus lemurinus lemurinus* monkeys will be initiated. In addition, work will be initiated in identifying invariant T cell epitopes (the targets of protective T lymphocyte responses) on the *P. falciparum* proteins that are included in the vaccines.

Year 2: The optimal immunization regimens will be established in the *Aotus* monkey system. GMP production of the optimized plasmid DNA vaccines will be concluded.

Year 3: Pre-clinical safety and immunogenicity studies for IND (investigational new drug application) submission will be concluded and an IND will be submitted to the FDA. A phase I/II safety, immunogenicity, and protective efficacy study will be conducted in volunteers at the Naval Medical Research Institute/National Naval Medical Center.

**(5) TECHNOLOGY TRANSFER POTENTIAL:** Immunization is unquestionably the most efficient and cost effective method for preventing all infectious diseases. The vaccine technology to be demonstrated under this project will have obvious dual use capacity for the military and private sector. The malaria vaccines developed will have immediate use in the military and civilian sectors, and the DNA vaccine technology will be widely applicable to the development of numerous vaccines for military and civilian use. In fact the NMRI Malaria Program has already transferred its proprietary DNA vaccine technology to other DoD investigators working to develop vaccines against a variety of infectious diseases of military and civilian importance including dengue fever, hepatitis, and typhus. The work accomplished under this transfer topic will be critical to moving all of that work into human studies.

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- (6) **PRINCIPAL LABORATORY:** Mail Address: Naval Medical Research Institute.  
8901 Wisconsin Avenue  
Bethesda, Maryland 20889-5607  
Principal POC: CAPT R.W. Walter, Code 00, (301) 295-1121  
CAPT T. Singer, NMRDC, Code 04, (301) 295-6182  
Contract personnel: Mr. Joe Rofrano, NMRI (301-295-2780).  
Technical personnel: CAPT S.L. Hoffman, Code 42, (tel: 301-295-0026/2079,  
fax: 301-295-6171).  
CDR R. Hedstrom, NMRI (301-295-1535/1776/2079),  
Dr. Martha Sedegah, NMRI (301-295-4476/1807/2079).

**Number: FDLDP-010**

- (1) **AGENCY:** Naval Medical Research Institute (NMRI), Bethesda, MD  
**TITLE:** Advanced Testing and Evaluation of the Mutant E. Coli Enterotoxin LT<sub>R192G</sub> Adjuvant  
A Non-Toxic Mucosal Adjuvant for Oral Vaccines of Major DoD and Public Health Significance

(2) **OBJECTIVE.** Evaluate the safety and efficacy of a mutated E. coli heat-labile enterotoxin (LT<sub>R192G</sub>) as a mucosal adjuvant for potentiation of prototype and investigational orally administered vaccines. Prevention of infectious illnesses through improved vaccines is a high priority to Navy and military medicine. In terms of morbidity, diarrheal diseases pose the largest infectious disease threat to deployed U.S. forces worldwide. Considering their BW potential, the collective threat of all agents infecting their host via the mucosa, provides the battlefield potential for the occurrence of potentially catastrophic infectious disease outbreaks during regional conflicts. Recent advances toward a better understanding of the mucosal immune system, and the identification of novel mucosal adjuvants, suggest the use of an adjuvant, in combination with oral and/or parenteral immunization, may substantially improve the level of protection afforded by new or existing vaccine preparations against conventional infectious disease agents, as well as BW threats.

- (3) **DEFENSE LABORATORY AND TECHNOLOGY.** Naval Medical Research Institute, Bethesda, MD.  
Collaborating Institution: U.S. Army Medical Materiel Development Activity (USAMMDA), Ft. Detrick, MD.

A majority of infectious diseases in both military and civilian populations are contracted via mucosal routes i.e. the gastrointestinal, respiratory, and urogenital tracts. Currently, there are no effective technologies for producing long-lived immunity to mucosal pathogens through the use of safe, non-living vaccines. One strategy currently under development employs an oral adjuvant derived from a bacterial toxin termed LT (an adjuvant is simply an additive that non-specifically potentiates the response to any vaccine combined with it). LT has shown considerable promise as an oral mucosal vaccine adjuvant when tested in laboratory animals and non-human primates. When recently given orally to volunteers, it was shown to be well tolerated at doses within the range predicted to have adjuvant activity in humans. However, a mutated form of LT, recently constructed by Clements and Dickinson at Tulane University, with ONR support, appears even more useful. This mutant, termed LT<sub>R192G</sub> or mLT, is modified in such a way as to substantially reduce its toxicity while retaining its adjuvant activity in animals. It is anticipated that like native LT, mLT will allow effective oral immunization by simply mixing the mLT with killed bacteria or viruses, and then administering the mixture by mouth. This means of immunization substantially reduces costs, while improving vaccine efficacy for a wide array of mucosal pathogens. The finding that the mLT has reduced toxicity, while retaining its adjuvant properties, represents a significant breakthrough in mucosal adjuvant research. Such a leap in technology should be capitalized upon, but the full potential and resultant benefits of a new generation of oral vaccines utilizing this technology can only come about with adequate funding for expedited testing of this product.

- (4) **Scope of Work:** It is proposed to test the safety and adjuvant activity of mLT first in animals, then in human volunteers. These data are needed before the transition to more advanced stages of development (6.3b/6.4), which may ultimately lead to FDA licensure of the recombinant adjuvant for general civilian and DoD use. Specific

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animal models of toxicity, immunity, and protection have already been developed as part of NMRI's ongoing Campylobacter Vaccine and LT Adjuvant Development Program (Campylobacter causes a diarrheal disease frequently experienced in military personnel and travelers). These mouse, rabbit and ferret models will be used to establish dosage windows for safety, adjuvant activity, and the degree of enhanced protection when mLT is administered with an existing prototype whole-cell Campylobacter vaccine. The effects of this new adjuvant on the immunogenicity and efficacy of other DoD prototype vaccines will also be explored. Comparisons of immune parameters in animals given vaccine alone, vaccine plus native LT adjuvant, and vaccine plus mLT will provide the pre-clinical data necessary to justify the production of a pilot lot of adjuvant under GMP conditions, followed by further safety and adjuvant activity testing in human volunteers. After successful completion of the animal and human studies, results will be reviewed and a decision will be made regarding the transition of this product to more advanced stages of development (6.4) under sponsorship by the U.S. Army Medical Materiel Development Activity and the FDA as an Investigational New Drug (IND). Because the testing of native LT in humans will have been completed by this time, mLT safety and immunogenicity studies will be quickly and efficiently transitioned to human testing.

**(5) TECHNOLOGY TRANSFER.** This work is expected to have a profound impact on both military and private sector applications in mucosal vaccine development. Currently, DoD has several oral enteric vaccines in advanced development and testing which may show substantial efficacy improvement if co-administered with the mLT adjuvant. Because mLT represents a potential breakthrough in mucosal adjuvant technology, this advancement is expected to leapfrog our current state of development for mucosal adjuvants. This newly engineered adjuvant not only has broad application for improving the efficacy of a variety of existing prototypic vaccines against enteric pathogens, but also has considerable potential for use with vaccines against other mucosal agents of public health significance ( e.g. influenza, HIV), as well as those presenting known BW threats (e.g. plague, anthrax). Because there is no 6.3 funding currently programmed for extended development of mLT, these potential benefits can only be realized through supplemental funding during FY 95-97.

**(6) PRINCIPAL LABORATORY:**

Mail Proposals to: Naval Medical Research Institute (NMRI)

8901 Wisconsin Ave.

Bethesda, Maryland 20889-5607

Principal POC:

CAPT R. W. Walter, Code 00, (301) 295-1121

CAPT T. Singer, Code 04, NMRDC, (301) 295-6182

Contract Specialist:

Mr. Joseph Rofrano, NMRI, (301) 295-2780

Technical Specialist:

CAPT A. L. Bourgeois, MSC, USN (Code 43), (301) 295-0138

## APPENDIX B

### PAGE INDEX

#### FEDERAL DEFENSE LABORATORY DIVERSIFICATION PROGRAM

#### OPERATIONS OTHER THAN WAR / LAW ENFORCEMENT TOPICS

<i>Topic Title</i>	<i>Page Number</i>
Commercialization of Weapons Team Engagement and Training Technology.	29
Direct Broadcast Satellite	30
Precise Positioning of Distant Objects Using Global Positioning System and Digital Imagery	31
Speaker Identification For Law Enforcement	32
Digital Signal Enhancement Processor	33
Optical Security	35
Metal Object Identification For Improved Security Systems	35
Wide Area Surveillance Thermal Imagery	36
Advanced Ballistic Threat Protection for Law Enforcement Personnel	38

March 17, 1995

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**Appendix B****FEDERAL DEFENSE LABORATORY DIVERSIFICATION PROGRAM  
OPERATIONS OTHER THAN WAR / LAW ENFORCEMENT TOPICS****Number: FDLDPLE-001****(1) Agency:** Naval Air Warfare Center Training Systems Division

Title: Commercialization of Weapons Team Engagement and Training Technology.

**(2) DEFENSE LABORATORY AND TECHNOLOGY** Naval Air Warfare Center Training Systems Division.

The Weapons Team Engagement Trainer (WTET) is a video-based close quarter training system developed in-house by NAWCTSD. The WTET hardware and software design is modular using multiple PCs in a networked configuration. The WTET allows for up to nine trainees, instrumented with minor caliber weapons, to engage video adversaries in a multiple room configuration. The trainees are untethered to the system computer, allowing them to move freely throughout the training area while engaging targets in close quarter combat situations. Typical scenarios may include mission rehearsal, hostage rescue, and room clearing.

Each trainee wears a wireless data communication system transmitting and receiving trainee status to the system computer. During an exercise, the trainees must take appropriate cover just as they would in the real world to avoid being shot by video adversaries or team members. Scenarios are interactive with the trainees through the use of intelligent branching and tracking of trainees through the system computer. That is, the video adversaries change their behavior based on the behavior of the trainees. An example is if a trainee keeps his weapon aimed at an adversary after the adversary surrenders, the adversary will remain in the surrender pose. Conversely, if the trainee changes his weapon position, the adversary may draw a weapon and fire at the trainee.

Currently, the trainees can choose either an M16 or an MP5 weapon. Each trainee's weapon aim position is continuously monitored in real time before, during, and after trigger pull using a high-speed infrared spot tracker. This information is used during replay to determine where the trainee shot and how he tracked his targets. This information is also used to determine if the trainee maintained his sector of fire. Other forms of feedback include live video and audio recordings of the training team during the exercise.

**(3) OBJECTIVE.** The objective is to transition weapons team engagement training technology and related technology used for training decision making on the use of force to a commercial system. This system could be used for state and federal law enforcement training. A number of law enforcement agencies expressed interest in using the Weapons Team Engagement Trainer technology for training their personnel. There is also a military requirement for enhanced training for special operations forces. By building a commercial weapons team engagement training system, the Department of Defense could gain a commercial source for these training systems.

**(4) DETAILED DESCRIPTION.** The research and development conducted by NAWCTSD focused on addressing specific close quarter combat training requirements such as the ability to track the performance of nine trainees in real time. There are features in the current design which should be modified to address requirements of civilian customers. There are also areas which may need further development to convert the current technology to a commercial training system. The tasks envisioned for this effort are:

Year 1: Match civilian training requirements to current WTET capabilities. Design and develop a new prototype system using knowledge from the current WTET to address civilian requirements. Specifically, the following hardware and software requirements should be addressed:

- o Miniaturize spread spectrum wireless data communication system.
- o Reduce battery size and consumption.
- o Improve IR tracker sensitivity possibly using image intensifier.
- o Use commercially available imaging lens for IR tracker.
- o Instrument new weapons such as pistols.
- o Add weapon recoil using miniature CO2 cartridges.
- o Develop software to automate video target outlining.

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- o Develop generic branching rules and techniques to simplify scenario production.
- o Increase training area to improve trainee sector of fire.

Year 2: Field the prototype and evaluate the capability of the system based on user feedback and performance. Make modifications to the design based on results of evaluations.

**5. TECHNOLOGY TRANSFER POTENTIAL.** The law enforcement community expressed interest in having a WTET system to train law enforcement teams in decision making, teamwork, and engagement tactics. Twenty military, federal and state law enforcement agencies have participated in training capability demonstrations of the WTET prototype. Feedback has been extremely favorable and all are interested in future training opportunities with this system. Law enforcement officers confront high costs associated with incorrect decision making. The Weapons Team Engagement Training Technology offers a safe, yet effective way for officers to improve their performance in making decisions, working as a team, and in tactical operations.

WTET technology has attracted the interest of the California Commission on Peace Officer Standards and Training as well as the Los Angeles County Sheriff's Department. The Los Angeles County Sheriff's Department has stated that the U.S. Navy has the WTET technology that satisfies most of their requirements for this type of training. There is also a market for this training technology internationally. In addition to the training applications, this technology has potential use in the entertainment industry for a large arcade game.

**(6) PRINCIPAL LABORATORY AND POINTS OF CONTACT (POC).**

Mail Proposals to: Naval Air Warfare Training Systems Division  
12350 Research Parkway  
Orlando, FL 32826-3224

Principal POC: Janet Weisenford-Healey, Code 111R2, Project Manager for Technology Transfer,  
(407) 380-4829

Technical Personnel: Mr. Robert McCormack, Code 4962, (407) 380-4582

**Number: FDLDPLE-002**

**1. Agency:** U. S. Army Communications-Electronics Command Research, Development and Engineering Center  
**TITLE:** Direct Broadcast Satellite (DBS)

**2. DEFENSE LABORATORY AND TECHNOLOGY:** Army Communications-Electronics Command. The commercial entertainment video industry is developing a direct to home video broadcast system using high powered satellites. The U.S. system is an all digital transmission system, and uses a compression and transmission format developed by the Motion Pictures Experts Group (MPEG). The commercial DBS system provides a stream of about 23 Mbps per satellite transponder into an 18 inch dish receiver. Four to eight full motion shows are sent in the 23 Mbps data stream. The military make its own unique use of the 23 Mbps stream. In the military situation, the receiver would be connected to a high resolution computer system instead of a TV. The computer would receive data, imagery, real time video (both still and full motion), etc. The military application, as a means of multimedia data transmission rather than a digitized video, has application to Law Enforcement also. As an example, the system could be used to transmit updates on wanted criminals to police departments simultaneously. The highly selective access authorization capability can insure control and privacy of the data. Images and multispectral data could be integrated into a single transmission and coded for reception. The addition of reception on the move, another thrust of the military requirement, could provide improvements to mobile headquarters at a civil disturbance or a disaster. This technology could also be applied to an individual squad car, if it can be shown to be cost effective.

**3. OBJECTIVE:** This system is a whole new concept of information broadcast and information on demand that parallels the entertainment video industry. This cutting edge technology needs to be analyzed for a variety of

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military and law enforcement applications. The purpose of this project is to develop and demonstrate U.S. DBS technology for military applications and law enforcement. All developments are to be MPEG compliant.

**4. DESCRIPTION:** The project will be implemented over a two year period.

First year effort will procure and develop necessary equipment to demonstrate the DBS network for real time imaging and video reception as well as large database transfers. Military and law enforcement applications should be demonstrated using the DBS technology with limited applications. Law enforcement variants, and scaled down versions of the system will be defined in conjunction with a wide range of experts in that area.

Second year effort will consist of development/adaptation of new technology to provide more users in the network including possibly development of an airborne relay to access worldwide coverage. A converter will be built to access various sources such as INTERNET. Expanded network demonstration, including addition of the Air Force and sectors of the law enforcement community will be developed. The feasibility of the addition of a lower data rate return link for user to-source interaction will also be addressed. COMSEC requirements will also be considered.

**5. TECHNOLOGY TRANSFER POTENTIAL:** In addition to military applications, the capability of the DBS system to offer point to multi-point widespread dissemination of multi-media information lends itself to the requirements of the law enforcement community, the State Department, and the US Forest Service. In addition, the need to transmit in secure modes of operation would be similar for both military and law enforcement.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposals to: U. S. Army Communications-Electronics Command Research, Development  
and Engineering Center

C3I Acquisition Center

ATTN: AMSEL-ACCA-D-AV

Fort Monmouth, NJ 07703-5008

Contract Specialist: Andrew Dellomo, (908) 532-1607

Technical Person (CECOM ORTA): Louis Jakub, Advanced Systems Directorate, (908) 544-2690

**Number: FDLDPLE-003**

(1) **AGENCY:** Naval Surface Warfare Center, Dahlgren, Virginia

Title: Precise Positioning of Distant Objects Using Global Positioning System(GPS) and Digital Imagery

(2) **COMMERCIAL TECHNOLOGY AND DEFENSE LABORATORY:** The desired commercial technology is to precisely position distant objects through aircraft collected digital imagery. Applications include emergency surveying of flood water areas, oil spills, forest fires and the positioning of disaster victims. The procedure uses the Global Positioning System, in a precise differential positioning mode, and eye-safe laser ranging.

The technology can also be applied to emergency law enforcement. The position and velocity of vehicles in pursuit can be determined from an aircraft and then displayed onto a digital map in near real-time. This information can then be sent to police vehicles for instantaneous display. (Note, car rental companies are already using GPS positioning and map displays in their vehicles.) In addition, aircraft could be used to survey the height of buildings or fences, distances between buildings, etc. in support of other police operations. These types of measurements could be determined to about a foot accuracy, with the proper camera lenses, and very quickly by semi-skilled personnel using a personal computer. Night vision for the digital image further enhances law enforcement capability. The military applications include precise positioning of potential targets on the ground through the use of manned aircraft or Unmanned Aerial Vehicles (UAV's). Other applications might include positioning of hostile Tactical Ballistic Missiles. For these applications, using similar positioning techniques for the strike or interceptor missiles fired against these targets would produce offsetting errors and would result in enhanced accuracy. The service laboratory is the Naval Surface Warfare Center, Dahlgren Division, in Dahlgren,



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Virginia. The center has contributed to precise Differential GPS technology and has expert experience in digital video image processing and laser ranging.

**(3) OBJECTIVE:** The objective of this project is to bring together recent advances in Differential Global Positioning System (DGPS) technology and laser ranging technology to position objects in digital video imagery collected by an aircraft. DGPS positioning accuracy is at the centimeter level for baselines of up to 30 km. Eye safe laser ranging accuracy is under one foot at the 6 km ranging distance. There are two specific project objectives. The first is a low cost (10 - 20m) differential positioning capability. The second objective is a higher accuracy (1m) differential positioning capability at a somewhat higher cost. The low and high cost issues mainly relate to the attitude determination systems incorporated into the overall system development. The lower cost proposes GPS only and the higher cost proposes GPS plus a low cost Inertial Navigation System (INS).

**(4) DETAILED DESCRIPTION**

- (A) Year 1:
  1. Development of a land based system
    - a. DGPS positioning (non-real time)
    - b. Video digital camera and IR camera
    - c. Laser ranging
    - d. GPS azimuth and leveling for attitude determination
  2. Software development
  3. Hardware synchronization and calibrations
  4. Analysis for low accuracy aircraft application
  5. Demonstrate civilian application potential and military forward observer capability
- (B) Year 2:
  1. Development of low accuracy aircraft applications with near real-time processing
  2. Software development
  3. Hardware synchronization and calibration
  4. Analysis for survey accuracy (INS) aircraft application and multispectral imaging
  5. Demonstrate capability
- (C) Year 3:
  1. Development of survey accuracy aircraft application
  2. Hardware synchronization and calibration
  3. Analysis of potential applications
  4. Demonstrate civilian surveying and military target positioning capabilities

**(5) TECHNOLOGY TRANSFER POTENTIAL.** The proposed technology development has private sector and civil government utility. Emergency disaster and law enforcement applications discussed above, plus emergency search and rescue applications, can be used in near real-time to position ground objects onto currently available digital maps for display on a computer screen. The technology offers additional civilian non-emergency applications. These include surveying for coastal and river soil erosion evaluation, natural disaster evaluations, natural resource evaluations and for buildings for 911 identification in rural area. The project is not limited to visible spectrum images. Infrared (IR) and microwave frequencies are also envisioned for the digital image. Other spectral frequencies and other sensors are also applicable. Real-time military applications include forward observer target positioning, ground target positioning from a UAV and detection and positioning of attacking ballistic missiles by aircraft for handover to missile interceptors.

**(6) PRINCIPAL LABORATORY AND POINTS OF CONTACT (POC)**

- a. Mail Proposals to: Naval Surface Warfare Center  
Dahlgren Division,  
Dahlgren, Virginia 22448-5100
- b. Principal POC: Ramsey Johnson, Code D4T  
(301) 394-1505
- c. Contract Specialist: Cindy Bowling (703)663-8037
- d. Technical Personnel: Alan G. Evans(703) 663-8405  
Gary Sitzman (703)663-8775

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**Number: FDLDPLE-004**

**1. AGENCY:** United States Air Force, Rome Laboratory  
**TITLE:** Speaker Identification For Law Enforcement

**2. DEFENSE LABORATORY AND TECHNOLOGY:** The technology that will be made available to this transfer program is the real-time automatic short utterance identification of persons through recognition of their voices.

**3. OBJECTIVE:** The objective of this program is to develop an automatic speaker identification capability that can identify suspects for use in law enforcement surveillance and booking operations.

**4. DETAILED DESCRIPTION:** The proposed system is based on RL's proven speaker identification technology which is already sufficiently mature to provide a useful and practical capability in this application.

The following tasks will be completed within the first year:

- \* Law enforcement requirements analysis
- \* Modify RL algorithms in accordance with the requirements analysis
- \* Laboratory test and evaluate algorithms
- \* Design & develop a simple and flexible operator interface for non-technical users

These tasks will be completed within the second year:

- \* Design & develop a portable speaker identification system for field test, evaluation, and demonstration
- \* Test and evaluate the system (lab&field)
- \* Make prototype available to local law enforcement agencies for their use
- \* Provide all documentation, six months of maintenance, and training of law enforcement personnel.

**5. TECHNOLOGY TRANSFER POTENTIAL:** The DoD has a high interest in the automatic identification, surveillance, and tracking of friendly and hostile military personnel. This same interest is shared by law enforcement agencies that must identify and track criminals and potential suspects. The capability to automatically identify individuals by their voice can fulfill both military and law enforcement applications and is indeed a dual use technology. Law enforcement applications include surveillance of suspects through wiretaps and cellular telephone intercepts, tracking of criminal activities through groups of individuals, identifying prisoner telephone contacts, reducing the number of suspects through sorting by voice, and many others. As illustrated above, this dual-use technology can provide multiple benefits to law enforcement agencies.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POC):**

Mail Proposal to: Rome Laboratory/PKPF

26 Electronic Parkway

Griffiss AFB, NY 13441-4514

Contract Specialist: Ms. Carla Walleasa, RL/PKPF, 315-330-7092

Technical Personnel: Edward J. Cupples, RL/IRAA, 315-330-4025, DSN 587-4025

**Number: FDLDPLE-005**

**1. AGENCY:** United States Air Force/Rome Laboratory  
**TITLE:** Digital Signal Enhancement Processor.

**2. DEFENSE LABORATORY AND TECHNOLOGY.** The related DoD technology is advanced digital signal processing, including both new ways to extract information (algorithms), new signal processing hardware and advanced packaging. Speech enhancement, audio interference cancellation, and adaptive signal processing, make speech more recognizable in the presence of masking sources, such as traffic, electromagnetic interference, hiss or static. Advanced packaging, multichip modules, and three dimensional packaging all reduce the size of the package while retaining functionality. Both technologies have been extensively explored by the Department of

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Defense, and have been spun off to nonmilitary entities, such as NASA, the FAA, the National Transportation Safety Board, intelligence agencies and private companies. These technologies have been developed by Rome Laboratory, working with other Federal Organizations and with private firms. The Signal Processing and Speech Processing Facilities at Rome Laboratory are available to support this activity.

**3. OBJECTIVE.** The objective of this effort is to develop a very portable (<1 pound) self contained, battery operated speech enhancement processor, which is separately programmed with a portable PC both between and during missions. This project brings together advances in speech processing with advanced packaging work. All of the separate areas (adaptive interference cancellation, packaging advances, and commercial portable PCs) have been developed and only need to be integrated to produce a cost-effective, portable speech enhancement processor.

**4. DETAILED DESCRIPTION.** The speech enhancement processor is a very portable, battery operated, real-time speech enhancement unit for use in covert, mobile field and hand-held applications. It will be programmed before or during the mission with a PC, (in the case of in-mission reprogramming, this will be done with a palm-top PC). It will eliminate hiss, whistles, hum, static, clicks, and other communications and environment related noises from the final speech, enhancing the ability to better understand speech. A second, even more portable version will be developed with the latest multichip module packaging technology, which has the same functionality.

The product development will require three steps: Design and Prototyping the system, including a cost analysis to determine that potential users will be able to afford and use the system; porting speech and other algorithms to the Prototyping board for testing; and designing an advanced packaging version of the board.

Year 1: 1) The detailed product affordability analysis will be performed to confirm that the product is cost effective, customer friendly, and technically feasible; 2) A design of the Speech Enhancement Processor will be performed to ensure that it will be compatible with the large base of developed software, and that it makes maximum appropriate use of commercial hardware, software and standards; 3) A determination of which features to make palm sized, and which to make part of the laptop PC; and 4) A prototype processor design will be made and simulated to verify the design functionality before fabrication. The appropriate code will be modified to operate on the miniaturized version, in coordination with the processor design and simulation, to assure that software modifications will be minimized by relevant use of commercial standards on both software and hardware.

Year 2: 1) The prototype will be fabricated, tested and fabricated again (if necessary); 2) The software port to the portable processor will be completed, tested and demonstrated; 3) A Multichip module version will be fabricated and demonstrated and 4) Field testing with law enforcement personnel will begin.

Year 3: 1) Field testing with law enforcement personnel will be completed, and 2) Transition to industry for both commercial and military production will begin.

**5. TECHNOLOGY TRANSFER POTENTIAL.** The primary technology transfer potential lies in Law Enforcement, including drug interdiction, immigration, and anywhere stakeouts require remote listening, or the received signal is degraded intentionally or accidentally. This could also be used on both military and civilian aircraft, where space is at a premium and a loss of the ability to understand voice messages could cause loss of life or property damage. The FAA already is using a Rome Laboratory developed antecedent of this technology in some of its control towers as a demonstration to increase air safety. The availability of commercially available components will reduce the acquisition cost for units compatible with DoD applications.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POC).**

Mailing Address for Proposals:	Rome Laboratory/PKPF 26 Electronic Parkway Griffiss AFB NY 13441-4514
Contract Specialist:	Ms. Carla Wallaesa, (315) 330-7092
Technical Personnel:	Jerry Genello, (315) 330-3576, DSN 587-3576

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**Number: FDLDPLE-006**

**1. AGENCY:** U.S. Air Force Rome Laboratory

**TITLE:** Optical Security

**2. DEFENSE LABORATORY AND TECHNOLOGY:** The DoD technologies which are applicable to this project are expertise in pattern recognition and target tracking, optical computing and optical signal processing, and nonlinear optics.

**3. OBJECTIVE:** The objective of project is to work to the level of a demonstration system that could be used to show the validity of the approach based on preliminary research and patents held by Rome Laboratory scientists.

**4. DETAILED DESCRIPTION:** In recent years, crime problems such as counterfeiting of currency and credit cards, illegal entry into secure areas (such as the World Trade Center) has increased to alarming proportions. With the rapid advances in computers, CCD technology, image processing hardware and software, printers, scanners, and copiers, it has become increasingly simple to reproduce pictures of logos, symbols, money bills or patterns, such as the holograms used on credit cards. In the military realm, access to secure areas and sensitive information through passes or IDs is an important application. The Optical Signal Processing Branch, over the last decade, has developed (and patented) optical processing technology and systems for the automatic detection, acquisition, and tracking of enemy targets. One of the outcomes of this work was the invention and development of the phase-only filter, a pattern recognition filter that represents a breakthrough in information compression, discrimination performance, and optical efficiency. It uses the fully parallel processing capability of optical processing, something digital processing has only recently begun to try to emulate. It is an extension of this technology developed with the phase-only filter that is being suggested for the security problem. The basic idea is that optical phase is not visible or readable by ordinary means such as video cameras or copying devices. It is only decipherable by complicated laser interferometric systems and appropriate optical pattern recognition systems. For example, an optical phase mask could be attached to a primary biosignature, such as a fingerprint or face image, to make it irreproducible.

In Year One, the effort would be in designing a system, and performing computer simulations to find the optimum signal processing technique or algorithm. Year Two would be to assemble the system and Year Three test and transfer the system and write a final report.

**5. TECHNOLOGY TRANSFER POTENTIAL:** The commercial market is in desperate need of a simple, inexpensive scheme to stem the more than \$3 billion a year credit card fraud, for example. Many applications would be as useful to the military as to commercial users, such as entry into sensitive areas, encoding vital components, such as certain military parts or computer chips, to guarantee authenticity or freedom from tampering.

**6. TECHNICAL POC AND CONTRACT SPECIALIST:**

Mail Proposal to: Rome Laboratory/PKPF  
Griffiss AFB, NY 13441-4514

Contract Specialist: Ms. Carla Wallaesa  
(315-330-7092)

Technical POC: Dr. Joseph L. Horner  
Rome Laboratory/EROP  
Hanscom AFB, MA, 01731  
(617-377-3841), DSN 478-3841

**Number: FDLDPLE-007**

**1. AGENCY:** US Air Force, Phillips Laboratory/WSR

**TITLE:** Metal Object Identification For Improved Security Systems

**2. DEFENSE LABORATORY AND TECHNOLOGY:** The theory of the singularity expansion method (SEM) was developed by Dr. Carl Baum of Phillips Laboratory and has been successfully demonstrated to be able to distinguish between different types of guns and even different types of coins when used along with low frequency transient magnetic field excitation. This technology will be applied to the improvement of the airport security

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systems and similar screening systems used in federal buildings and military installations. The Phillips Laboratory is a world leader in the development of ultra-wideband (UWB) transient electromagnetic technology. State-of-the-art transient sources, antennas, and receivers applicable to this work are developed and built by the EM Sources Division at Phillips Lab.

3. **OBJECTIVE.** Final development, demonstration, and transition of technology for the identification of metallic objects by exciting them with gated low frequency magnetic fields and extracting the unique signatures using the singularity expansion method.

4. **DETAILED DESCRIPTION:** Using standard metal detectors, it is possible to detect metal objects on a person, but it is not possible to identify the object or even tell its general shape. By employing the latest UWB technology and signature extraction theory based on SEM, objects can be detected and identified. In recent demonstrations, prototype detectors could tell the difference between three types of handguns and three different sizes of coins. This technology now is ready for transitioning to the private sector. This will be done by designing and building reliable production prototypes of the hardware and software necessary and placing the demonstrated technology in the hands of the industry.

5. **TECHNOLOGY TRANSFER POTENTIAL:** This technology will be used in airport security systems and other screening systems to detect and identify objects.

6. **PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposal to: Philips Laboratory/PL/PKWA

2251 Maxwell Avenue, S.E.

Kirtland AFB NM 87117-5772

Contract Specialist: Rudy Fourzan, PL/PKWA, DSN 246-6877, (505) 846-6877

Point of Contact: Dean Lawry, PL/WSR, DSN 246-0273, (505) 846-0273

Technical Specialist: William Prather, PL/WSR, DSN 246-0416, (505) 846-0416

**Number: FDLDPLE-008**

1. **AGENCY:** United States Air Force/ Electronic Systems Center

**TITLE:** Wide Area Surveillance Thermal Imager.

2. **DEFENSE LABORATORY AND TECHNOLOGY:** The DoD technology related to this project is low cost, uncooled, high-density focal plane arrays as developed under the Low Cost Uncooled Sensor Prototype (LOCUSP) Program funded by the Balanced Technology Initiative (BTI) program in FY87. The OSD provided funding to the Army's CECOM Center for Night Vision and Electro-Optics (C2NVEO) from FY89 through FY93 to produce brassboard systems for infra-red missile seekers, security sensors and Weapon sight military applications. One end result of that program was the successful advanced development and prototyping of the Security Sensor InfraRed (SSIR) by Texas Instruments utilizing a Barium-Strontium Titanate (BST) ferro-ceramic uncooled focal plane array.

Since 1988 USAF ESC's Electronic Security and Communications Center of Excellence (formerly ESD/AVJ) at Hanscom AFB, MA has actively participated in the requirements definition, specification, development, testing, productization, and dual use planning for the Security Sensor InfraRed. In 1991 a Memorandum of Agreement was signed by ESD/AVJ and the Army CECOM Center for Night Vision and Electro-Optics to jointly develop and procure LOCUSP thermal imaging systems for USAF security police missions. In addition, since 1990, ESC/AVJ has provided funded tasking to Sandia National Laboratory to support the development, testing and acquisition of advanced uncooled thermal imagers for USAF security applications. In 1993, ESC received eight prototypes of the Security Sensor InfraRed from Texas Instruments. Three of the SSIR prototypes have been integrated into the Wide Area Ramp Surveillance System (WARSS), currently being readied for Operational Test and Evaluation at its initial installation at Whiteman AFB, MO. In addition, the SSIR

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prototype has been baselined to meet the operational requirements of a tactical surveillance mission under the Tactical Automated Security System (TASS). The SSIR, known in the TASS program as the Wide Area Surveillance Thermal Imager (WSTI), has been undergoing extensive demonstration and testing during exercises in the Pacific Theater and will undergo formal QOT&E in FY95.

**3. OBJECTIVE:** The primary objective of this proposed effort is to transition an advanced DoD thermal imaging technology to the Federal & commercial markets by funding the producibility and reliability modifications resulting in a low-cost, robust security camera.

A second objective is to use this productization of a dual use thermal imager to lower the future acquisition cost baseline for a FY96-01 USAF requirement for 62 units (TASS Program). The cost savings to the USAF on the TASS program could be as much as \$2.8 million during that production period. In addition, the TASS program is a joint service program with demonstrated acquisition potential by numerous Federal Agencies and commercial users.

**4. DETAILED DESCRIPTION:** In both military and commercial applications, the SSIR is combined with a tripod to form a rapidly-deployable, robust surveillance system that can enhance perimeter security and provide command and control information to central and local security system operators. In semi-permanent application, the SSIR would be mounted to provide remote assessment incorporating manual, automatic or video motion detection imaging to the operator. This could include military flightline surveillance or commercial airport, refinery or large area surveillance applications. The SSIR has three components; the thermal imaging camera, the pan and tilt mounting system including the tripod, and the display and control unit. This project would use the product baseline established under the LOCUSP I contract and develop a dual use device by accomplishing the following technical tasks to each of the components:

a. Thermal Imaging Camera:

- \* Sensor Electronics - add focal plane array components- detector, chopper, housing, processing electronics
- \* Combine I/F & Servo-controller CCA into new I/O CCA
- \* Re-design I/O controller CCA for simpler RS-232/422 communications
- \* Build in local power converter with AC/DC capability & new flex CCA
- \* New lens design with fewer lens elements & improved enviro-seal

b. Pan-Tilt Head:

- \* Develop an interface to NDI pan tilt head with greater reliability
- \* Add automatic positioning capability via serial communications
- \* Integrate improved hardware assembly clamps & wiring connectors

c. Display & Control Unit:

- \* Integrate NDI commercial display technology (field emission display)
- \* Design in state-of-the-art electronic components improving robustness
- \* Add serial data linkage to generic security system annunciator

d. Test: & Packaging:

- \* Environmental & performance testing of complete system
- \* Low cost packing system for storage & transport

e. Documentation: 1) Reprourement drawing package for the device. (The government would be entitled to access to all documentation) ; 2) Operators & Maintainers Manuals with Training Course Materials.

**Schedule:** Year One: Items a-c completed 180 days after contract award, with delivery of one prototype.

Year Two: Items d & e to be completed 300 days after contract award.

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**5. TECHNOLOGY TRANSFER POTENTIAL:** The SSIR has high technology transfer potential, primarily in law enforcement applications including drug interdiction, border surveillance, and large area remote monitoring of nuclear sites and federal prison applications. In addition, this device can be used to help detect and control fires and in safety-related industry applications. The uses of low cost uncooled IR focal plane arrays is also being evaluated in industrial process control applications. The development of this device shows great historical similarity to the productization of the silicon CCD chip which is now ubiquitous in dual use applications worldwide.

**6. PRINCIPAL LABORATORY & POINTS OF CONTACT (POC)**

Mail Proposals to: Electronic Systems Command - Security Systems Product Group  
ESC/AVK  
20 Schilling Circle  
Hanscom AFB, MA 01731

Contracts POC: Lt Suzanne Staugler, (617) 377-6654; Commercial: (617) 377-2118

Program Manager: Capt. Jamie Thurber (DSN 478-2118)

Technical Point of Contact: Mr. Morris Outwater and Glenn Herosian

Telephone: DSN 478-6061 ; Commercial: 617-377-6061 Fax: DSN: 478-8832 or: 617-377-8832

**NUMBER: FDLDPLE-009**

**1. AGENCY:** U. S Army Natick Research, Development and Engineering Center

**TITLE:** Advanced Ballistic Threat Protection for Law Enforcement Personnel

**2. DEFENSE LABORATORY AND TECHNOLOGY:** Hetherington has shown that two component composite armor systems may be optimized to meet the requirements for small arms (rifle) protective armor systems. Recent work in this laboratory has shown that optimization of fabric-based armor systems may proceed along similar lines. Additionally, we have developed numerical models for the optimization of armor systems which will greatly aid in the development of armor systems optimized to meet the specific requirements of civilian law enforcement personnel. Natick, the Advanced Research Projects Agency (ARPA), and Army Research Laboratory (ARL) are presently involved in a complementary research and development programs to reduce the total weight of military body armor systems for protection against fragmentation type threats as well as rifle rounds and indirect fired flechettes. This proposed effort will leverage technological innovations in these ongoing research & development programs. A team of resident impact, blast, human factors, and MANPRINT experts will be available to work on the project.

**3. OBJECTIVE:** Development and optimization of "covert" ballistic protective body armor to protect against, at a minimum, a full range of handgun threats to which civilian law enforcement personnel are expected to be exposed. Optimization will be conducted with the objective of minimizing total system weight, and weight per unit area; the objective will also be to minimize mortality and morbidity associated with threat exposure. Armor system area of coverage, and associated human factors (such as reduction of heat stress) will be treated as parameters to maximize.

**4. DESCRIPTION:**

YEAR 1: Inconspicuous body armor currently exists for lower velocity handgun threats; however, as the level of threat increases the difficulty of providing "covert" body armor also increases. As threat levels increase, it becomes more evident that the individual is wearing protection and the protected area is more easily identified. The need for "covert" body armor with increased protection exists for both military and civilian missions.

Through a consortium with users, industry (materials manufacturers, and body armor manufacturers), academia, and government material and design engineers, this effort will develop the technology (materials and

March 17, 1995

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design) for a "covert" body armor protecting against a full range of handgun threats. Ballistic evaluations and human factors testing will be conducted on bread-broad prototypes in controlled laboratory evaluations and in user trials. Final brass-boards prototypes will be fabricated and technology data package(s) will be produced for transfer of technology.

YEAR 2: Based on criteria established through a parametric study, optimization of the Year One bullet protective system will be conducted to expand the level of protection beyond handgun threats. Materials technology will be developed and incorporated into the optimized design to provide the highest level protective "covert" armor system possible while maximizing inconspicuousness and user acceptance. Final brass-boards prototypes will be fabricated and technology data package(s) will be produced for technology transfer.

**5. TECHNOLOGY TRANSFER POTENTIAL:** Presently, civilian law enforcement personnel who are forced to use military protection systems or military explosive ordinance disposal systems may be placed at risk due to the differences in the expected threats between the two communities. Alternately, military personnel involved in operations other than war may be confronted with threats that are similar to those usually encountered by civilian law enforcement, and may be placed at risk for similar reasons. Consequently, systems optimized for specific threats are expected to have a high potential for private sector and military applications. Similarly, civilian law enforcement personnel frequently wear the Personnel Armor for Ground Troops system (PASGT) helmet (a fragmentation protective helmet) when confronted by the possibility of small arms bullet assault. Since the PASGT helmet is not designed to provide protection against this threat, these personnel are exposed to substantial risk. Upgraded protection for these personnel would have a high potential for commercial and military application.

**6. PRINCIPAL LABORATORY AND POINTS OF CONTACT (POCs):**

Mail Proposals to: Commander, U.S. Army Natick RDE Center

ATTN: SATNC-PB

Natick, MA 01760-5011

Contract Specialist: Arthur O'Dea (508) 651-4289

Technical Personnel: Janet Ward(508) 651-5462, and Philip Cunniff (508)651-S463



March 17, 1995

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## APPENDIX C

This section contains synopses of the Public Laws, Conference language and Congressional Committee action relating to the FY 1995 Authorization of Appropriations for the Federal Defense Laboratory Diversification (FDLD) Program, followed by excerpts of Title 10.

***FY 1995 PUBLIC LAW - DEFENSE AUTHORIZATION ACT (103-337):***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
2862	Title XI Defense Conversion, Reinvestment & Transition Assistance. \$2,190.4M RDT&E for Def Conv, Reinvest & Trans, defined by 1992 & 1993 Acts of same title, & this title.
2864	\$2,190.4M for Defense Conversion, Reinvestment & Transition: \$50M for loan guarantee; \$10M for FDLD Program, in title 10, section 2519, added by section 1113(a) below.
2864	Section 1112. Technologies for Law Enforcement & Military Operations Other Than War. Support DoD/DoJ MOU, \$41M: \$11M of the \$2,190M RDT&E above; \$30M in ARPA Tactical Technology & Experimental Evaluation of Major Innovative Technology PEs.
2865	Section 1113(a). Title 10 chapter 148 amended adding section 2519: FDLD Program. SecDef conduct program to promote cooperation between DoD labs & industry on R&D of dual-use technology to further national security objectives of section 2501(a). Shall provide for cooperative arrangements (partnerships) between a DoD lab & eligible firms and nonprofit research corporations (Section 2511b). Partnership may also include one or more additional federal labs, institutions of higher education, State & local government, as appropriate. A FFRDC is considered a DoD lab if sponsored by DoD. May use grants, contracts, cooperative agreements, other transactions, as well as cooperative R&D agreements, to establish partnerships. May provide partnership with technical or other assistance to facilitate achieving the purpose. Non-Federal government participants shall make substantial contribution to total cost, commensurate with the risk and potential benefits for the participant. Section 2511c(2) shall apply to in-kind contributions made by non-federal governments. Competitive procedures shall be used in the selection of partnerships. Selection criteria shall include the criteria in section 2511f.
2866	Provides for MOU to administer Loan Guarantee Program w/SBA & Commerce Depart.

***FY 1995 AUTHORIZATION CONFERENCE REPORT (103-701):***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
34	DoD FFRDCs that function primarily as a research laboratory may respond to solicitations promoting research, development, demonstration, or transfer of technology.
753	PE603570D \$76M; \$11M provided for law enforcement/peacekeeping initiative.
754	Defense lab diversification \$10M; Loan guarantees \$50M; Small Business technical assistance \$5M; Operations other than warfare/law enforcement \$11M. Total for law enforcement program is \$41M, including support DoD & DoJ MOU. In addition to \$11M direct \$30M at ARPA. Senate support for MOU; House specifies technology of interest to DoD&DoJ. Urge DoD/DoJ share technology, but acquisition & deployment should be in respective agency. Support House report (103-499), also Sniper ID & response should be reviewed.

***FY 1995 AUTHORIZATION CONFERENCE REPORT (103-701):***  
***(continued from previous page)***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
755	Senate bill provides statutory framework for the FDLDP Program. The House contained no provision, but receded in conference. Conferees agree to \$50M for loan guarantee program with SBA and Economic Development Admin. At least 60% to small business, remainder to medium, DoD contractors; eligibility requirements provided.

***FY 1995 SENATE ARMED SERVICES COMMITTEE REPORT (103-282):***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
105	Aware of ARPA program to focus technology on non-traditional military operations; DoD & DoJ MOU; DoD/DoE National Labs. \$20M to ARPA to continue multi-agency research
139	Recommends requested amount. Statutory mandate for FDLDP Program in Chapter 148 of Title 10: protection against non-competitive earmarking of projects, as do TRP projects.

***FY 1995 HOUSE ARMED SERVICES COMMITTEE REPORT (103-499):***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
281	Defense worker retention a condition of loan guarantee authority; permit small business 90 days after TRP award to obtain cost share; select projects competitively w/cost share reqd.
284	TRP PE contains: Loan guarantee code, Section 2524 of Title 10, condition on loans to support retention of defense workers; discuss w/ DoC, DoL, & SBA. \$37M for Center for Defense & Law Enforcement Technology; types of assistance: concealed weapons detection, authorized-user-only "safe" handgun, gunfire localization, less-than-lethal tech to halt vehicles & subjects, personnel status monitors, interactive simulators, explosive ordnance detection, mobile sensor platforms, urban mapping & scene generation, advanced sensor integration; national center for development, available to state/local law enforcement.
285	Recommended combining FDLDP Program with TRP; supports the goals of FDLDP, most efficient with TRP. Untapped opportunity to partner small business w/venture capitalists; permit small business 90 days after TRP award to obtain cost share.

***FY 1995 PUBLIC LAW - DEFENSE APPROPRIATIONS ACT (103-335):***

<u>Pg</u>	<u>SYNOPSIS OF LANGUAGE</u>
2613	\$50M shall be available only to cover the costs (section 502(5)) of the Federal Credit Reform Act of 1990 (2U.S.C. 661a(5)) of loan guarantees issued pursuant to subsection (b)(3) of that section.

***FY 1995 APPROPRIATIONS CONFERENCE REPORT (103-747):***

Pg	SYNOPSIS OF LANGUAGE
155	Deletes House language establishing transfer account. Supports Defense Conversion, Reinvestment & Transition Act 1992; \$3,297M: Title I(Procurement) \$530.7M; Title II (O&M) \$680.2M w/ \$55.8M for Other Conversion Initiatives; Title IV(RDT&E) \$2,086M w/ \$550M for TRP PE63570E; \$73.7M Other Defense Reinvestment PE63570D
156	Defense Reinvestment PE63570D specified: \$50M Loan Guarantees, \$7.5M Law Enforcement Technology, \$16.2M for Other Reinvestment Initiatives. Tactical Technology PE 62702E specifies \$10M for Law Enforcement Technology. EEMIT PE 603226E specifies \$20M for Law Enforcement Technology.
156	Other Conversion Initiatives section "suggests DoD consider funding" 26 specific conversion projects, totaling \$71.955M in FY 1995.

***FY 1995 SENATE APPROPRIATIONS COMMITTEE REPORT (103-321):***

Pg	SYNOPSIS OF LANGUAGE
316	Deletes \$61.6M for DoD labs to participate in defense conversion efforts similar to TRP. 80 % of funds would go to industry, which mirrors the way DoD labs manage their PE's. Also DoD labs are partners in a significant portion of TRP awards. Denies entire request. Committee is aware of a proposed magnetic levitation transportation system, urges ARPA to carefully evaluate and consider allocating \$2M in TRP.
317	Establishes a new PE, provides \$27M, for an increase in funds available to SBA to back loans for small business affected by the decline in defense.

***FY 1995 HOUSE APPROPRIATIONS COMMITTEE REPORT (103-562):***

Pg	SYNOPSIS OF LANGUAGE
284	Recommends consolidating all Defense Conversion and Reinvestment funds in one transfer account totalling \$1,401.944M. <u>(Receded in Conference, see above)</u> Urges the department to provide \$37M to support a Center for Defense and Law Enforcement Technology.
284	\$50M within the TRP for loan guarantee authority for small and medium sized companies
284	Other Conversion Initiatives. Suggests DoD consider funding a specified 19 conversion projects, totalling \$55.744M.

March 17, 1995

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**SELECTED ADDITIONAL PROVISIONS OF UNITED STATES CODE*****The following synopses of reference sections of TITLE 10, CHAPTER 148  
National Defense Technology & Industrial Base, Defense Reinvestment &  
Defense Conversion, 103rd Congress, April 1993***

<b>Pg</b>	<b>REFERENCE SECTION AND SYNOPSIS</b>
903	<b>2501(a)</b> National security objectives: (1) Supply and equip the force structure of the armed forces to achieve (a) objectives in the national security strategy report; (b) policy guidance of SecDef; (c) future-years defense program submitted to Congress. (2) Sustain production, maintenance, repair and logistics for military operations. (3) Maintain advanced research and development to provide systems capable of ensuring technological superiority. (4) Reconstitute within a reasonable period the capability to develop and produce supplies & equipment, including technologically advanced systems, to prepare fully for a war, national emergency, or mobilization before commencement of war or emergency.
903	<b>2501(b)</b> Policy Objectives relating to Defense Reinvestment, Diversification and Conversion: further objectives in subsection (a) thru programs that (1) promote economic growth in high-wage, high-tech industries, and preserve industrial and technical skill base; (2) promote economic growth thru further reduction of the deficit, freeing up capital for private investment and job creation in the private sector; (3) bolster the national tech base, including critical technologies with dual use; (4) retraining of separated military, civilian and industry personnel for jobs in activities important to economic growth and security; (5) assist State and local levels to support reinvestment, conversion, adjustment and diversification; (6) assist small businesses affected by reductions in defense.
910	<b>2511(b)</b> Non-Department of Defense Participants. In each partnership, entities of the partnership shall include two or more eligible firms or a nonprofit research corporation established by two or more eligible firms and may also include, as determined appropriate by SecDef, a Federal Laboratory or laboratories, government-owned and operated industrial facilities, institutes of higher education, and agencies of state governments.
910	<b>2511(c)</b> Financial Commitment of Non-Federal Government Participants. SecDef shall ensure that, to the maximum extent practicable, funds provided by the government under a partnership does not exceed the amount provided by non-Federal government participants.
911	<b>2511(e)</b> Selection Process. Competitive Procedures shall be used to establish partnerships.
911	<b>2511(f)</b> Selection Criteria. Criteria for selection of proposed partnerships shall include: (1) Extent partnership advances national security objectives; (2) Technical excellence; (3) Qualifications of personnel proposed; (4) Timely private sector investment to achieve goals and objectives of the partnership, other than through the partnership; (5) Potential effectiveness of partnership in further development and application of technology developed by the partnership, for the national technology and industrial base; (6) Financial commitment of eligible firms to partnership; (7) Does not unnecessarily duplicate other projects; (8) Other criteria the Secretary prescribes.